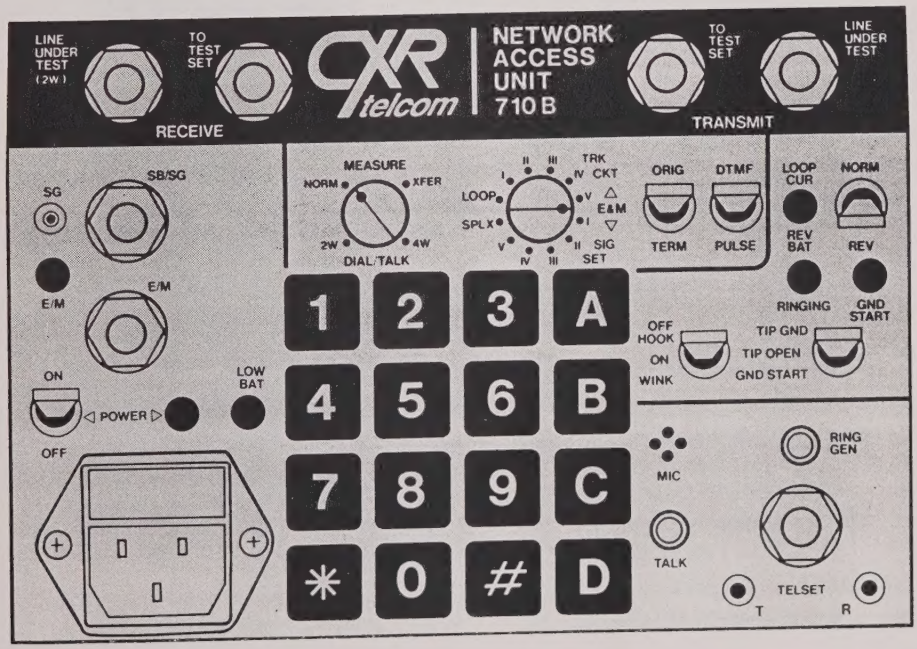
TECHNICAL LIBRARY
02491

HALCYON 710B

NETWORK ACCESS UNIT

CXR telcom

MODEL 710B
NETWORK ACCESS UNIT



Quick Reference Guide

Digitized by the Internet Archive
in 2025

https://archive.org/details/manualsplus_05411

Model 710B
Network Access Unit

QUICK REFERENCE GUIDE

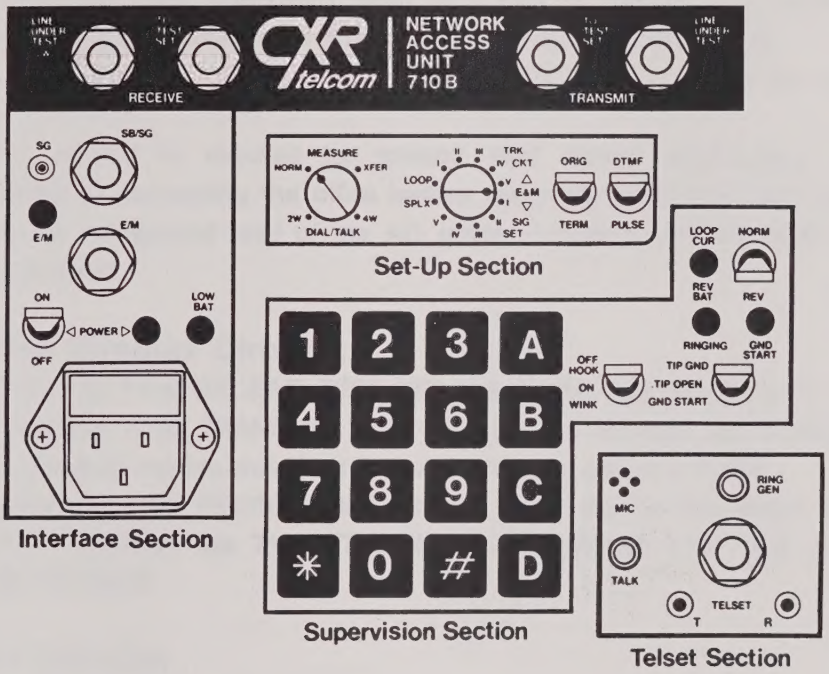
SECTION	TOPIC	PAGE
1.	Front Panel Review	2
2.	When to Use AC Power	2
3.	Connecting the 710B	3
4.	2-Wire Loop Start - Simulate Station Equipment	4
5.	2-Wire Loop Start - Simulate Central Office	6
6.	2-Wire Ground Start - Simulate Station Equipment	8
7.	2-Wire Ground Start - Simulate Central Office	10
8.	Direct Inward Dial - Simulate Terminating Equipment	12
9.	Direct Inward Dial - Simulate Originating Equipment	14
10.	4-Wire (Simplex) Loop Start - Simulate Station Equipment	16
11.	4-Wire (Simplex) Ground Start - Simulate Station Equipment	18
12.	E&M Supervision - Simulate Signaling Set	20
13.	E&M Supervision - Simulate Trunk Circuit	22

© 1987 CXR Telcom Corporation

1

FRONT PANEL REVIEW:

The 710B controls and indicators are divided into four functional groups on the front panel:



2

WHEN TO USE INTERNAL BATTERIES versus AC POWER:

For those tests in which the 710B will be signaling E&M or Simplex, or when it is sending office battery or ring generator the 710B is powered through the AC power connector. For all other access tests, the 710B's internal batteries may be used.

CONNECTING THE 710B:

For 2-Wire Loop Start, Ground Start, and DID Circuits:

1) Connect the 710B RECEIVE TEST SET jack to the test set RECEIVE jack. Connect the 710B TRANSMIT TEST SET jack to the test set TRANSMIT jack. (Six inch double-ended #310 cords provided with the 710B).
2) Connect the 710B RECEIVE LINE UNDER TEST jack to the line under test.
3) Signal ground is required for ground start dialing applications. It is obtained by connecting the office battery return to the SG terminal on the 710B, or the ground lead of the AC power connector on the 710B must be grounded.

For 4-Wire Simplex Circuits:

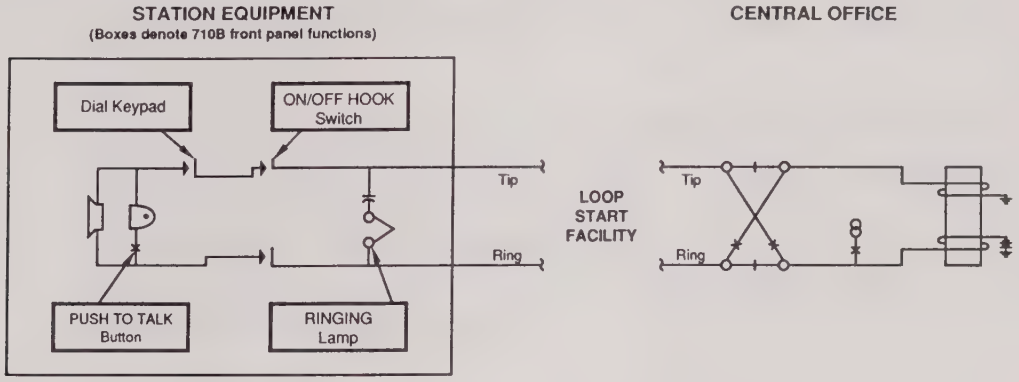
1) Connect the 710B RECEIVE TEST SET jack to the test set RECEIVE jack. Connect the 710B TRANSMIT TEST SET jack to the test set TRANSMIT jack. (Six inch double-ended #310 cords provided with the 710B).
2) Connect the 710B RECEIVE LINE UNDER TEST jack to the circuit T1/R1 leads. Connect the 710B TRANSMIT LINE UNDER TEST jack to the circuit T/R leads.

For E&M Circuits:

1) Connect the 710B RECEIVE TEST SET jack to the test set RECEIVE jack. Connect the 710B TRANSMIT TEST SET jack to the test set TRANSMIT jack. (Six inch double-ended #310 cords provided with the 710B).
2) Connect the 710B RECEIVE LINE UNDER TEST jack to the circuit T1/R1 leads. Connect the 710B TRANSMIT LINE UNDER TEST jack to the circuit T/R leads.
3) Connect the E&M leads of the trunk under test to the E&M jack on the 710B. On the E&M jack, "E" is Tip and "M" is Ring.
4) When testing type II, III or IV circuits, connect the signal battery and signal ground of the trunk under test to the SB/SG jack on the 710B, and connect the AC Power input on the 710B. On the SB/SG jack, "SG" is Tip and "SB" is Ring. SB/SG connections are not required when testing type I or V interfaces.

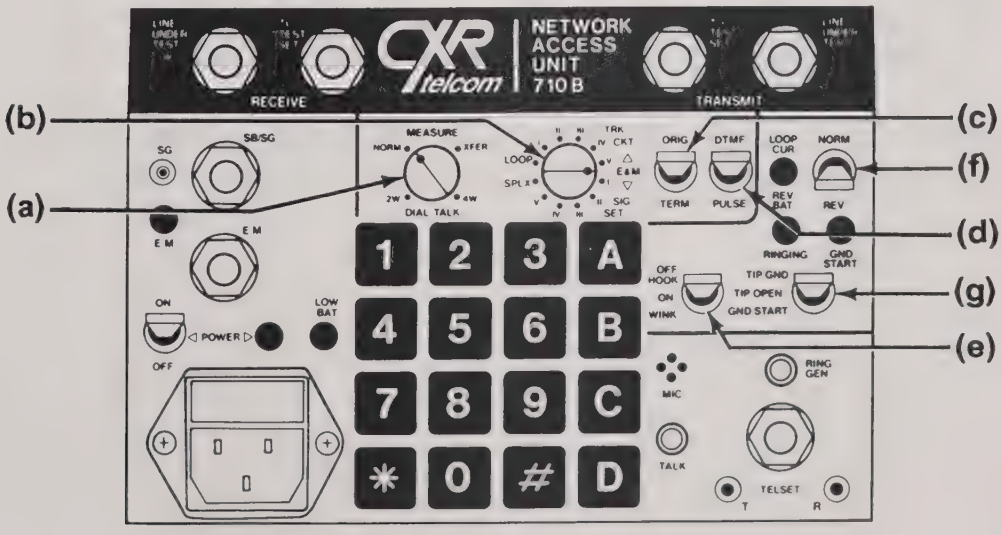
2-WIRE LOOP START - SIMULATE STATION EQUIPMENT:

Where Used: At the station end of a loop-start C.O. line circuit, MB1 circuit, WATS circuit, FX line, outgoing access line, OPX, etc.



Switch Settings:

a) DIAL/TALK knob: 2W
b) Signaling switch: LOOP
c) ORIG/TERM switch: ORIG
d) DTMF/PULSE switch: Either position
e) Hook switch: ON hook
f) NORM/REV switch: NORM
g) GND START switch: TIP GND



Dialing Procedure:

1) Select OFF hook.
2) The LOOP CUR/REV BATT lamp will light "red" to indicate the flow of loop current.
3) Dial the number.
4) If the circuit being tested returns answer supervision, the LOOP CUR/REV BATT lamp will change from "red" to "green" to indicate reverse battery supervision from the C.O. when the called party goes off hook.
5) See "Transmission Testing" procedure below.
6) Select ON hook to end the call. The LOOP CUR/REV BATT lamp extinguishes when the loop is open.

Answer Procedure:

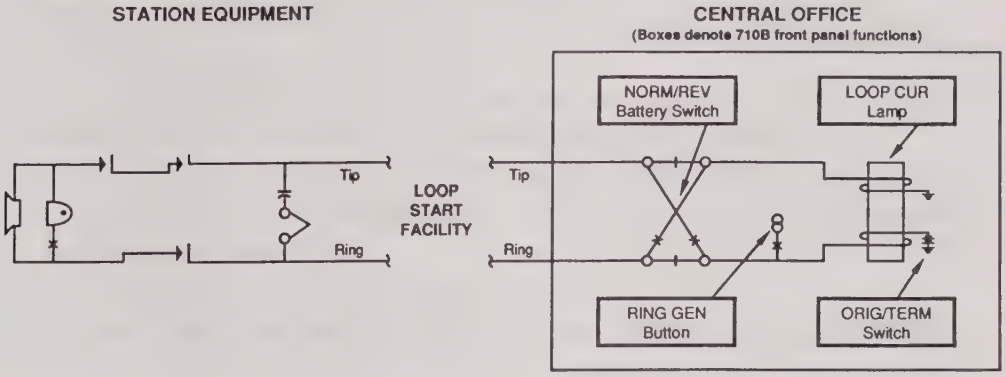
1) When the C.O. sends ringing generator, the 710B RINGING lamp flashes.
2) Select OFF hook to trip ringing and answer the call.
3) The LOOP CUR/REV BATT lamp will light "red" to indicate the flow of loop current.
4) See "Transmission Testing" procedure below.
5) Select ON hook to end the call. The LOOP CUR/REV BATT lamp extinguishes when the loop is open.

Transmission Testing:

1) It is possible to perform transmission tests with the test set by switching from 2W DIAL/TALK into either of the two MEASURE functions. Select the NORM (normal) position to make measurements and the XFER (transfer) position in order to transmit.
2) If you wish to talk over the line under the test, switch the DIAL/TALK knob back to 2W, then depress the TALK button to speak and release the button to listen.

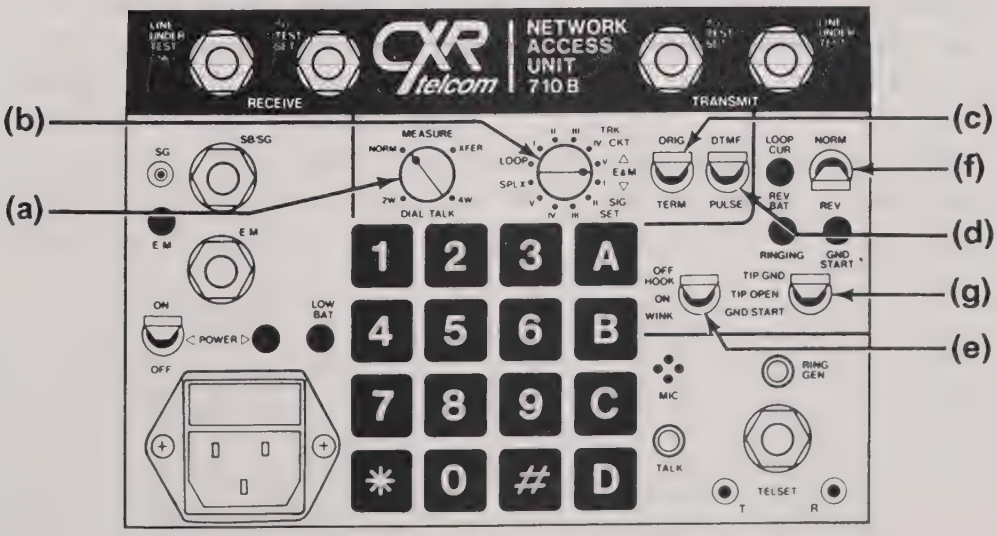
2-WIRE LOOP START - SIMULATE CENTRAL OFFICE:

Where Used: At the office end of a loop-start C.O. line circuit, or PBX end of an OPX circuit, MB1 circuit, WATS circuit, FX line, etc.



Switch Settings:

a) DIAL/TALK knob: 2W
b) Signaling switch: LOOP
c) ORIG/TERM switch: TERM
d) DTMF/PULSE switch: Not used
e) Hook switch: OFF hook
f) NORM/REV switch: NORM
g) GND/GND START switch: TIP GND



Answer Procedure:

1) When the station equipment goes off hook, the LOOP CUR/REV BATT lamp will light "green" to indicate the flow of loop current.
2) Adjust the test set VOLUME knob to hear incoming "signaling" from the station equipment.
3) If the circuit being tested requires answer supervision, set the NORM/REV switch to REV to simulate C.O. reverse battery supervision.
   In this case, the LOOP CUR/REV BATT lamp will change from "green" to "red" to indicate reverse battery supervision from the 710B (i.e., the called party went off hook).
4) See "Transmission Testing" procedure below.
5) Set the ORIG/TERM switch to ORIG to end the call. The LOOP CUR/REV BATT lamp extinguishes when the loop is open.

Ringing Procedure:

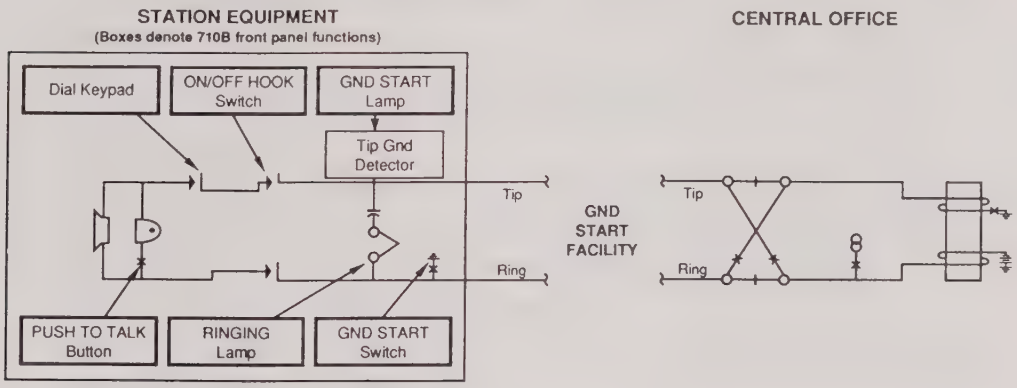
1) Depress and hold the RING GEN button for two second intervals.
2) When the Station Equipment goes off hook, the LOOP CUR/REV BATT lamp will light "green" to indicate the flow of loop current.
3) See "Transmission Testing" procedure below.
4) Set the ORIG/TERM switch or "ORIG" to end the call. The LOOP CUR/REV BATT lamp extinguishes when the loop is open.

Transmission Testing:

1) It is possible to perform transmission tests with the test set by switching from 2W DIAL/TALK into either of the two MEASURE functions. Select the NORM (normal) position to make measurements and the XFER (transfer) position in order to transmit.
2) If you wish to talk over the line under the test, switch the DIAL/TALK knob back to 2W, then depress the TALK button to speak and release the button to listen.

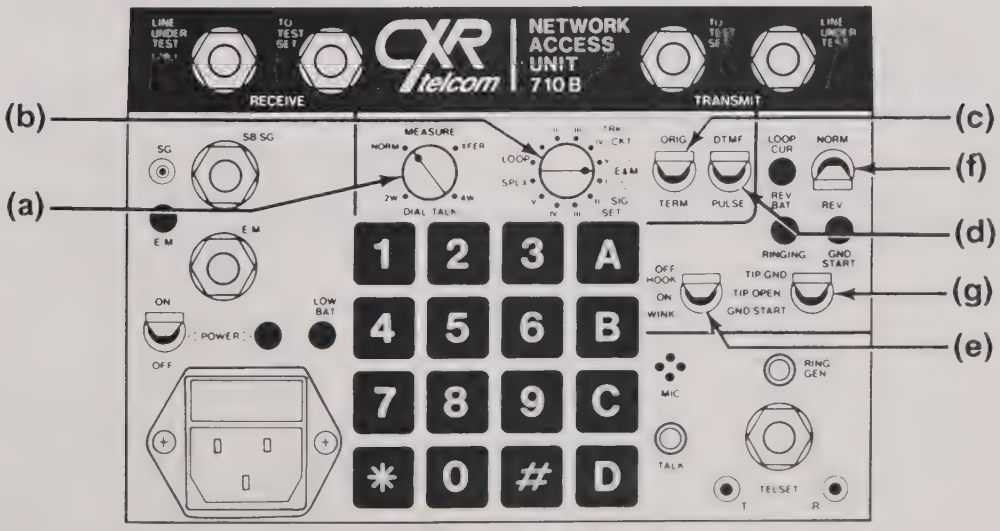
2-WIRE GROUND START - SIMULATE STATION EQUIPMENT:

Where Used: At the station end of a ground-start C.O. trunk, access trunk, FX, etc.



Switch Settings:

a) DIAL/TALK knob: 2W
b) Signaling switch: LOOP
c) ORIG/TERM switch: ORIG
d) DTMF/PULSE switch: Either position
e) Hook switch: ON hook
f) NORM/REV switch: NORM
g) GND/GND START switch: TIP GND



Dialing Procedure:

1) Select OFF hook.
2) Operate the momentary (spring loaded) GND START switch to ground the ring lead.
3) When the C.O. returns ground on the Tip, the LOOP CUR/REV BATT lamp will light "red" to indicate the flow of loop current.
4) Dial the number.
5) If the circuit being tested sends answer supervision, the LOOP CUR/REV BATT lamp will change from "red" to "green" to indicate reverse battery supervision from the C.O. (when the called party goes off hook).
6) See "Transmission Testing" procedure below.
7) Select ON hook to end the call. The LOOP CUR/REV BATT lamp extinguishes when the loop is open.

Answer Procedure:

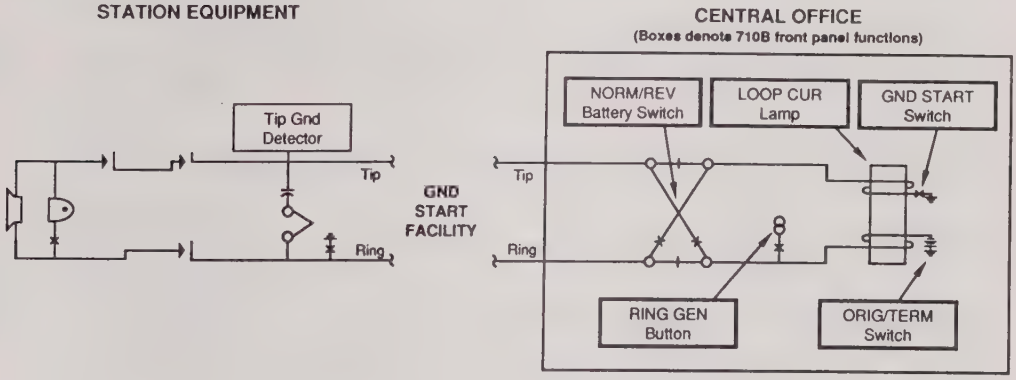
1) When the C.O. sends ringing generator, the 710B RINGING lamp flashes.
2) Select OFF hook to trip ringing and answer the call.
3) The LOOP CUR/REV BATT lamp will light "red" to indicate the flow of loop current.
4) See "Transmission Testing" procedure below.
5) Select ON hook to end the call. The LOOP CUR/REV BATT lamp extinguishes when the loop is open.

Transmission Testing:

1) It is possible to perform transmission tests with the test set by switching from 2W DIAL/TALK into either of the two MEASURE functions. Select the NORM (normal) position to make measurements and the XFER (transfer) position in order to transmit.
2) If you wish to talk over the line under the test, switch the DIAL/TALK knob back to 2W, then depress the TALK button to speak and release the button to listen.

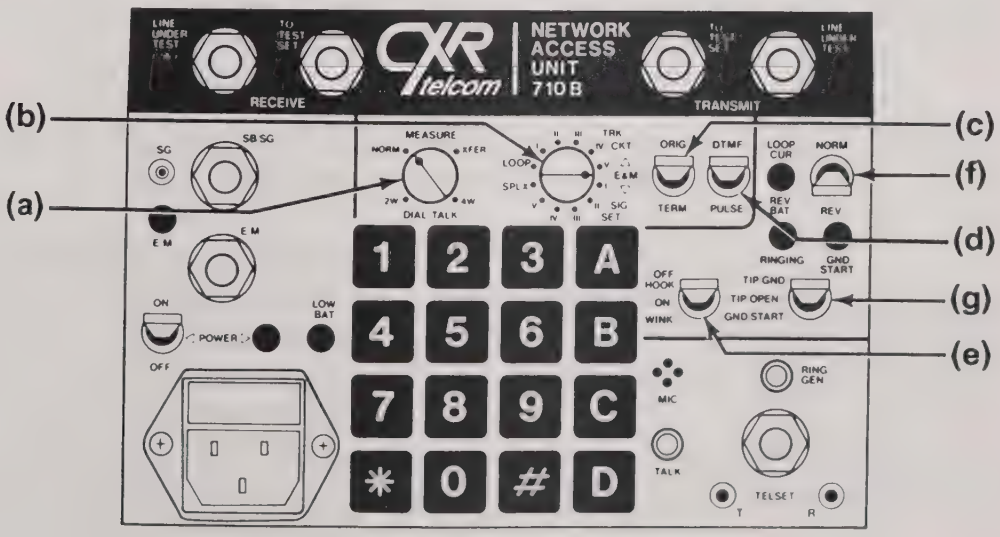
2-WIRE GROUND START - SIMULATE CENTRAL OFFICE:

Where Used: At the office end of a ground-start C.O. trunk, access trunk, FX, etc.



Switch Settings:

a) DIAL/TALK knob: 2W
b) Signaling switch: LOOP
c) ORIG/TERM switch: TERM
d) DTMF/PULSE switch: Not used
e) Hook switch: OFF hook
f) NORM/REV switch: NORM
g) GND START switch: TIP OPEN



Answer Procedure:

1) When the station equipment goes off hook, the GND START lamp lights to indicate Ring ground.
2) Set the TIP OPEN/TIP GND/GND START switch to TIP GND.
3) Observe that the GND START lamp goes off to indicate ground return on the TIP.
4) The LOOP CUR/REV BATT lamp will light "green" to indicate the flow of loop current.
5) Adjust the test set VOLUME knob to hear incoming "signaling" from the station equipment.
6) If the circuit being tested requires answer supervision, set the NORM/REV switch to REV to simulate C.O. reverse battery supervision.
   In this case, the LOOP CUR/REV BATT lamp will change from "green" to "red" to indicate reverse battery supervision from the C.O. (i.e., the called party went off hook).
7) See "Transmission Testing" procedure below.
8) Set the ORIG/TERM switch to ORIG to end the call. The LOOP CUR/REV BATT lamp extinguishes when the loop is open.

Ringing Procedure:

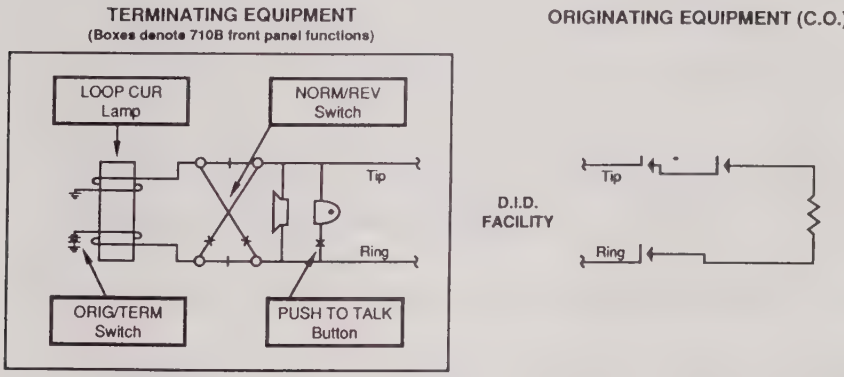
1) Set the TIP OPEN/TIP GND/ GND START switch to TIP GND in order to seize the trunk under test.
2) Depress and hold the RING GEN button for two second intervals.
3) When the Station Equipment goes off hook, the LOOP CUR/REV BATT lamp will light "green" to indicate the flow of loop current.
4) See "Transmission Testing" procedure below.
5) Set the ORIG/TERM switch to ORIG to end the call. The LOOP CUR/REV BATT lamp extinguishes when the loop is open.

Transmission Testing:

1) It is possible to perform transmission tests with the test set by switching from 2W DIAL/TALK into either of the two MEASURE functions. Select the NORM (normal) position to make measurements and the XFER (transfer) position in order to transmit.
2) If you wish to talk over the line under the test, switch the DIAL/TALK knob back to 2W, then depress the TALK button to speak and release the button to listen.

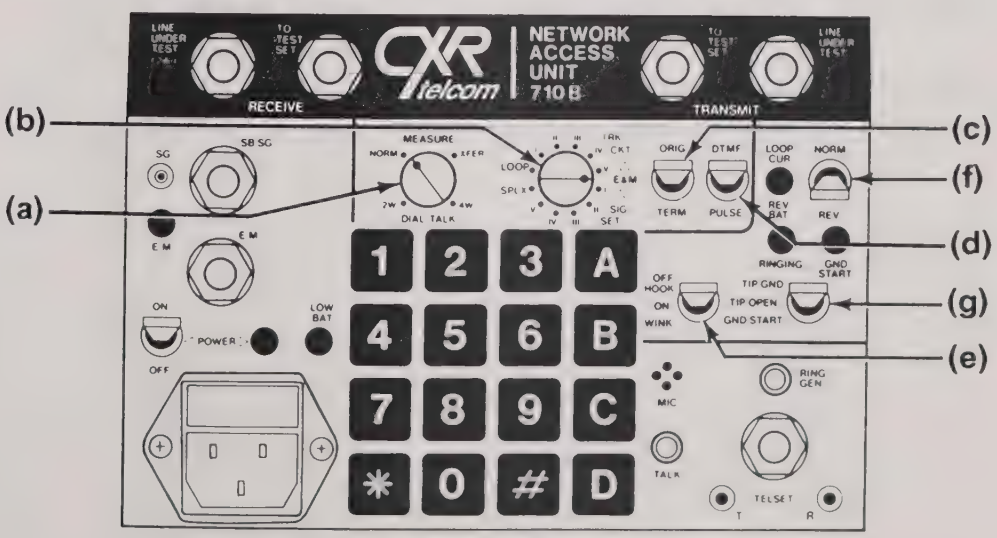
DIRECT INWARD DIAL - TERMINATING EQUIPMENT:

Where Used: At the terminating end of a loop, reverse battery D.I.D. trunk.



Switch Settings:

a) DIAL/TALK knob: 2W
b) Signaling switch: LOOP
c) ORIG/TERM switch: TERM
d) DTMF/PULSE switch: Not used
e) Hook switch: OFF hook
f) NORM/REV switch: NORM
g) GND START switch: TIP GND



Answer Procedure:

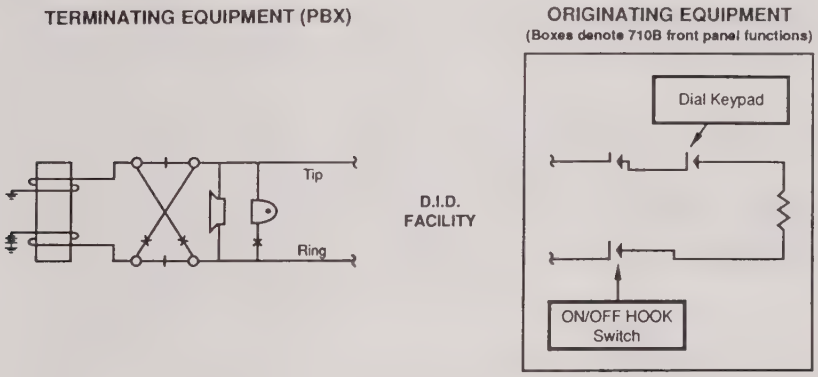
1) When the C.O. goes off hook, the LOOP CUR/REV BATT lamp will light "green" to indicate the flow of loop current.
   Note: If the trunk is set for "immediate dial", skip to step (03). If the trunk is set for "wink start", proceed with step (02).
2) After the LOOP CUR lamp lights, operate the momentary WINK switch. (This will cause the 710B to reverse battery for 200mSec). Note: Operate the WINK switch within one second after the LOOP CUR/REV BATT lights "green".
3) Adjust the test set VOLUME knob to hear incoming "signaling" from the C.O.
4) Set the NORM/REV switch to REV to simulate CPE reverse battery supervision.
5) The LOOP CUR/REV BATT lamp will change from "green" to "red" to indicate reverse battery supervision from the 710B (i.e., the called party went off hook).
6) See "Transmission Testing" procedure below.
7) Set the ORIG/TERM switch to ORIG to end the call. The LOOP CUR/REV BATT lamp extinguishes when the loop is open.

Transmission Testing:

1) It is possible to perform transmission tests with the test set by switching from 2W DIAL/TALK into either of the two MEASURE functions. Select the NORM (normal) position to make measurements and the XFER (transfer) position in order to transmit.
2) If you wish to talk over the line under the test, switch the DIAL/TALK knob back to 2W, then depress the TALK button to speak and release the button to listen.

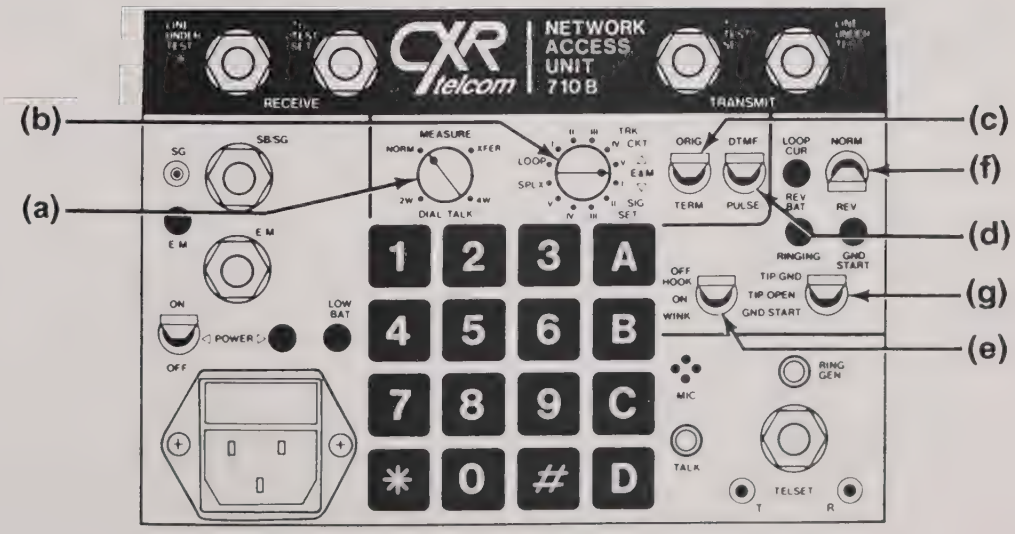
DIRECT INWARD DIAL - SIMULATE ORIGINATING EQUIPMENT

Where Used: At the originating end of a loop, reverse battery D.I.D. trunk.



Switch Settings:

a) DIAL/TALK knob: 2W
b) Signaling switch: LOOP
c) ORIG/TERM switch: ORIG
d) DTMF/PULSE switch: Either position
e) Hook switch: ON hook
f) NORM/REV switch: NORM
g) GND START switch: TIP GND



Dialing Procedure:

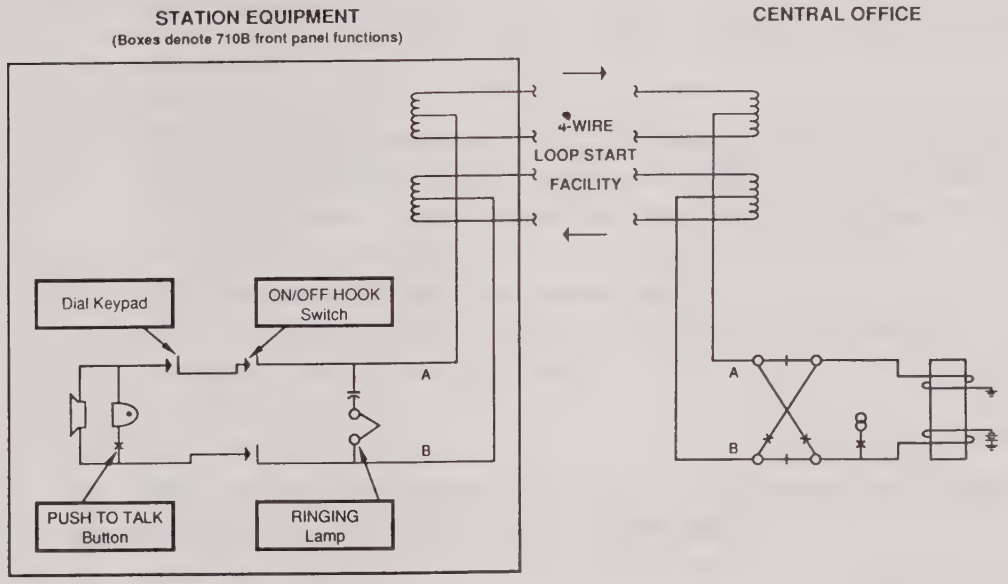
1) Select OFF hook.
2) The LOOP CUR/REV BATT lamp will light "red" to indicate the flow of loop current. Adjust the test set VOLUME knob to hear dial tone on the line under test.
   Note: If the trunk is set for "immediate dial", skip to step (04). If the trunk is set for "wink start", proceed with step (03).
3) Observe that the LOOP CUR/REV BATT lamp momentarily changes from "red" to "green" then back to "red" again. This is an indication of the "wink start" from the terminating equipment.
4) Dial the number.
5) The LOOP CUR/REV BATT lamp will change from "red" to "green" to indicate reverse battery supervision from the PBX when the called party goes off hook.
6) See "Transmission Testing" procedure below.
7) Select ON hook to end the call. The LOOP CUR/REV BATT lamp extinguishes when the loop is open.

Transmission Testing:

1) It is possible to perform transmission tests with the test set by switching from 2W DIAL/TALK into either of the two MEASURE functions. Select the NORM (normal) position to make measurements and the XFER (transfer) position in order to transmit.
2) If you wish to talk over the line under the test, switch the DIAL/TALK knob back to 2W, then depress the TALK button to speak and release the button to listen.

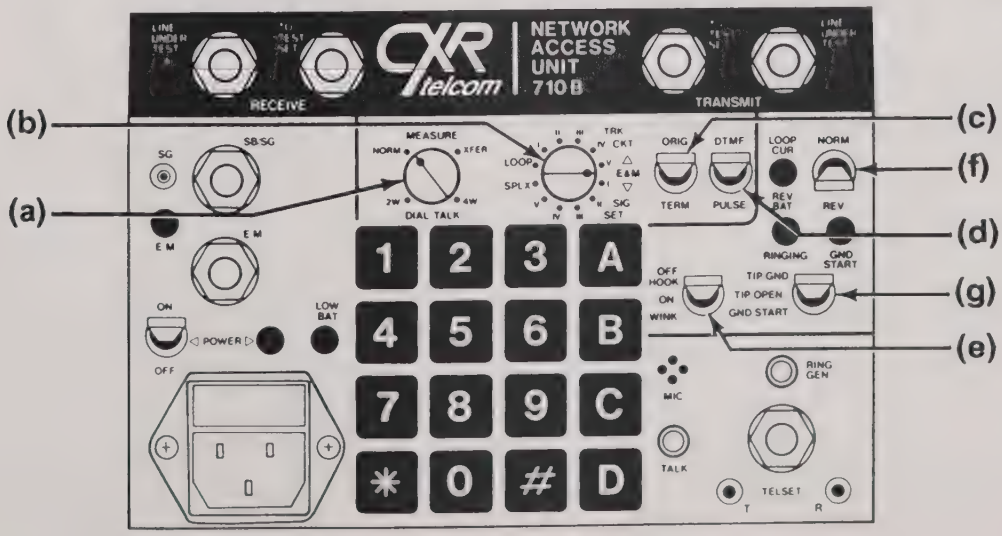
4-WIRE (SIMPLEX) LOOP START - SIMULATE STATION EQUIPMENT:

Where Used: At the station end of a loop-start C.O. line circuit, FX line, access line, etc.



Switch Settings:

a) DIAL/TALK knob: 4W
b) Signaling switch: SPLX
c) ORIG/TERM switch: ORIG
d) DTMF/PULSE switch: Either position
e) Hook switch: ON hook
f) NORM/REV switch: NORM
g) GND START switch: TIP GND



Dialing Procedure:

1) Select OFF hook.
2) The LOOP CUR/REV BATT lamp will light "green" to indicate the flow of loop current.
3) Dial the number.
4) If the circuit being tested sends answer supervision, the LOOP CUR/REV BATT lamp will change from "green" to "dark" then back to "green" again to indicate reverse battery supervision from the C.O. (when the called party goes off hook).
5) See "Transmission Testing" procedure below.
6) Select ON hook to end the call. The LOOP CUR/REV BATT lamp extinguishes when the loop is open.

Answer Procedure:

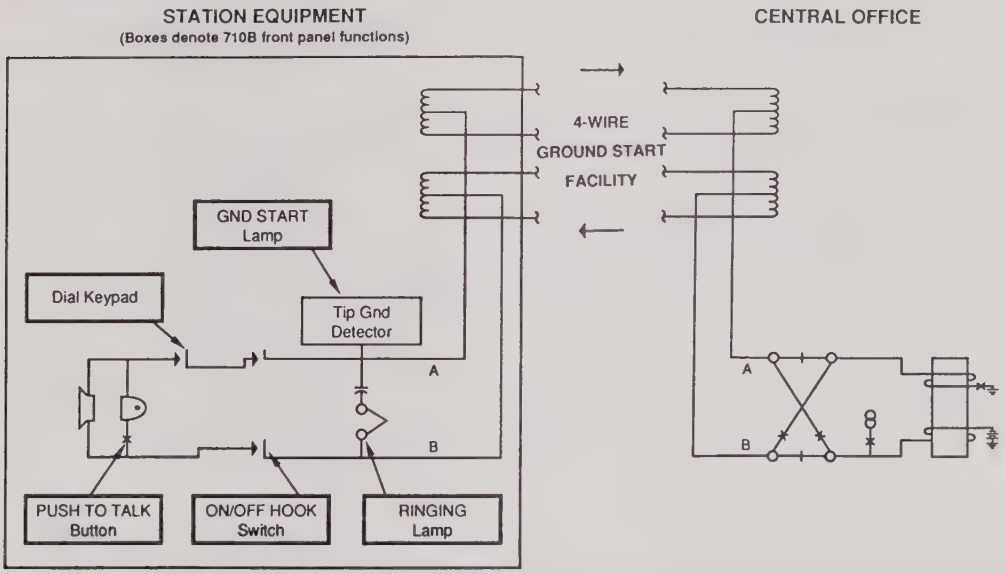
1) When the C.O. sends ringing generator, the 710B RINGING lamp flashes.
2) Select OFF hook to trip ringing and answer the call.
3) The LOOP CUR/REV BATT lamp will light "green" to indicate the flow of loop current.
4) See "Transmission Testing" procedure below.
5) Select ON hook to end the call. The LOOP CUR/REV BATT lamp extinguishes when the loop is open.

Transmission Testing:

1) It is possible to perform transmission tests with the test set by switching from 4W DIAL/TALK into the MEASURE function. Select the NORM (normal) position.
2) If you wish to talk over the line under the test, switch the DIAL/TALK knob back to 4W, then depress the TALK button to speak and release the button to listen.

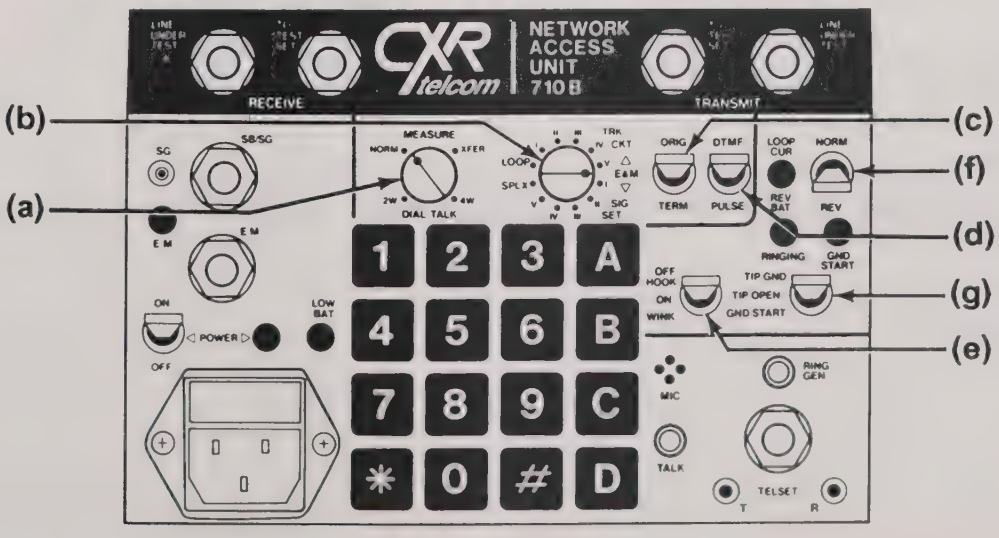
4-WIRE (SIMPLEX) GROUND START - SIMULATE STATION EQUIPMENT:

Where Used: At the station end of a ground-start C.O. line circuit, FX line, access line, etc.



Switch Settings:

a) DIAL/TALK knob: 4W
b) Signaling switch: SPLX
c) ORIG/TERM switch: ORIG
d) DTMF/PULSE switch: Either position
e) Hook switch: ON hook
f) NORM/REV switch: NORM
g) GND START switch: TIP GND



Dialing Procedure:

1) Select OFF hook.
2) Operate the momentary (spring loaded) GND START switch to ground the B-lead.
3) When the C.O. returns ground on the A-lead, the LOOP CUR/REV BATT lamp will light "green" to indicate the flow of loop current.
4) Dial the number.
5) If the circuit being tested sends answer supervision, the LOOP CUR/REV BATT lamp will change from "green" to "dark" then back to "green" again to indicate reverse battery supervision from the C.O. (when the called party goes off hook).
6) See "Transmission Testing" procedure below.
7) Select ON hook to end the call. The LOOP CUR/REV BATT lamp extinguishes when the loop is open.

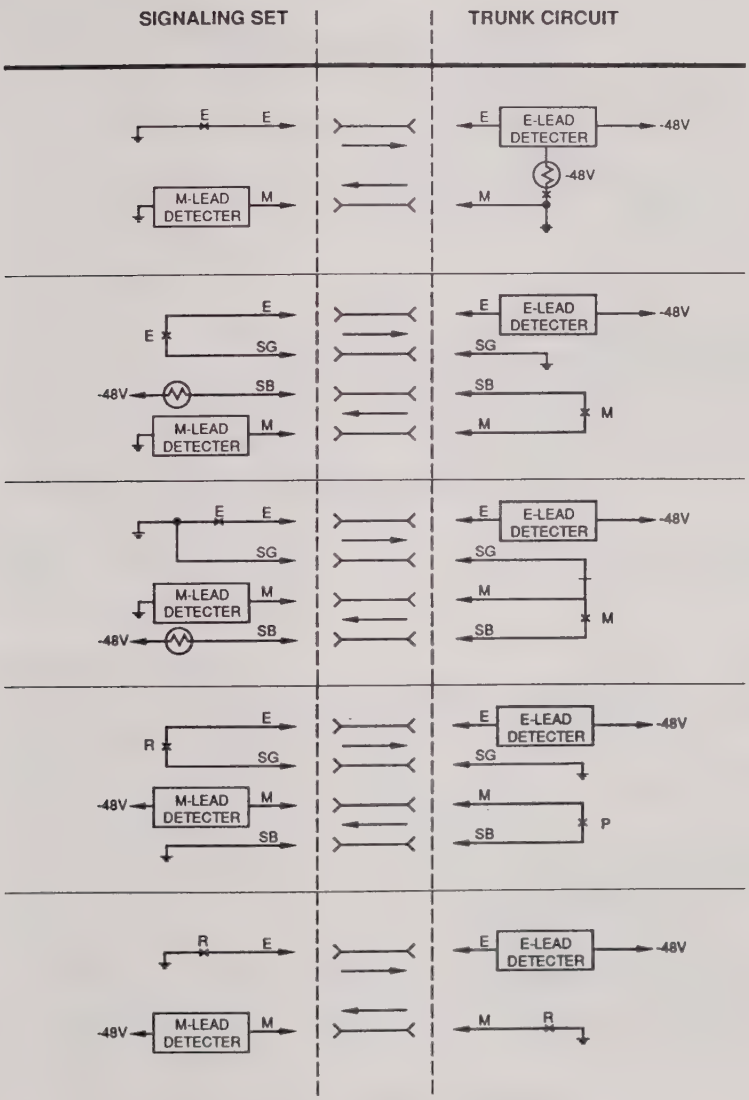
Answer Procedure:

1) When the C.O. sends ringing generator, the 710B RINGING lamp flashes.
2) Select OFF hook to trip ringing and answer the call.
3) The LOOP CUR/REV BATT lamp will light "green" to indicate the flow of loop current.
4) See "Transmission Testing" procedure below.
5) Select ON hook to end the call. The LOOP CUR/REV BATT lamp extinguishes when the loop is open.

Transmission Testing:

1) It is possible to perform transmission tests with the test set by switching from 4W DIAL/TALK into the MEASURE function. Select the NORM (normal) position.
2) If you wish to talk over the line under the test, switch the DIAL/TALK knob back to 4W, then depress the TALK button to speak and release the button to listen.

E&M SUPERVISION - SIMULATE SIGNALING SET:



Switch Settings:

a) DIAL/TALK knob: 4W
b) Signaling switch: SIG SET, I thru V
c) ORIG/TERM switch: Not used
d) DTMF/PULSE switch: Either position
e) Hook switch: ON hook
f) NORM/REV switch: NORM
g) GND START switch: TIP GND

Originating A Call:

1) Select OFF hook. This operates the "E" lead.
   Note: If the trunk is set for "immediate dial", skip to step (03). If the trunk is set for "wink start", proceed with step (02).
2) Observe that the E&M lamp momentarily changes from "off" to "red" then back to "off" again. This is an indication of the "wink start" from the trunk circuit over the M-lead.
3) Dial the number.
   When "PULSE" dialing is selected, pulsing will take place on the "E" lead in the "SIG SET" (signaling set) mode. When "DTMF" dialing is selected, signaling will take place over the transmit "T" and "R" leads.
4) The E&M lamp will change from "off" to "red" to indicate that the M-lead is off hook (i.e., the called party went off hook).
5) See "Transmission Testing" procedure below.
6) Select ON hook to end the call. The E&M lamp extinguishes when the called party goes on hook.

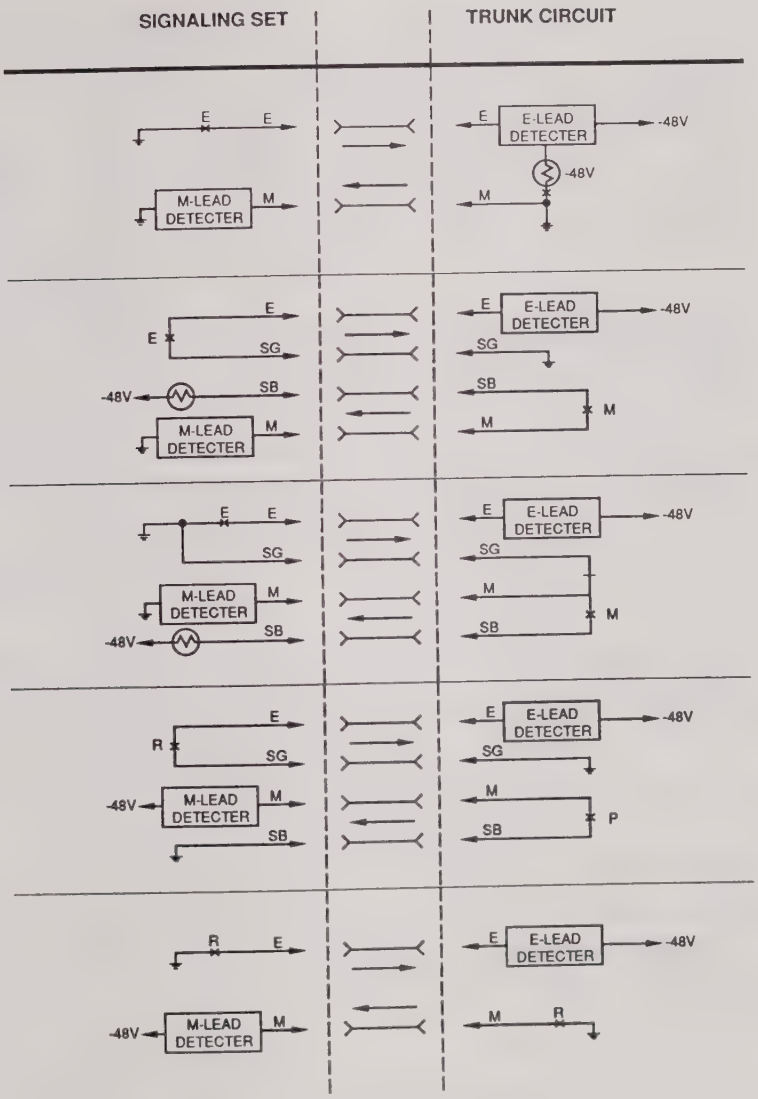
Terminating A Call:

1) When the switch originates the call, the E&M lamp will light "red" to indicate that the M-lead is off hook.
   Note: If the trunk is set for "immediate dial", skip to step (03). If the trunk is set for "wink start", proceed with step (02).
2) After the E&M lamp lights, operate the momentary WINK switch. (This will cause the 710B to send E-lead off hook for 200mSec). Note: Operate the WINK switch within one second after the E&M lamp lights.
3) Adjust the test set VOLUME knob to hear DTMF or MF digits, or if Dial Pulse signaling is used, observe that the E&M lamp flashes as the digits are pulsed over the M-lead.
4) Select OFF hook to simulate answer supervision.
5) See "Transmission Testing" procedure below.
6) Select ON hook to end the call. The E&M lamp extinguishes when the calling party goes on hook.

Transmission Testing:

1) It is possible to perform transmission tests with the test set by switching from 4W DIAL/TALK into the MEASURE function. Select the NORM (normal) position.
2) If you wish to talk over the line under the test, switch the DIAL/TALK knob back to 4W, then depress the TALK button to speak and release the button to listen.

E&M SUPERVISION - SIMULATE TRUNK CIRCUIT:



Switch Settings:

a) DIAL/TALK knob: 4W
b) Signaling switch: TRK CKT, I thru V
c) ORIG/TERM switch: Not used
d) DTMF/PULSE switch: Either position
e) Hook switch: ON hook
f) NORM/REV switch: NORM
g) GND START switch: TIP GND

Originating A Call:

1) Select OFF hook. This operates the "M" lead.
   Note: If the trunk is set for "immediate dial", skip to step (03). If the trunk is set for "wink start", proceed with step (02).
2) Observe that the E&M lamp momentarily changes from "off" to "red" then back to "off" again. This is an indication of the "wink start" from the signaling circuit over the E-lead.
3) Dial the number.
   When "PULSE" dialing is selected, pulsing will take place on the "M" lead in the "TRK CKT" (trunk circuit) mode. When "DTMF" dialing is selected, signaling will take place over the transmit "T" and "R" leads.
4) The E&M lamp will change from "off" to "red" to indicate that the E-lead is off hook (i.e., the called party went off hook).
5) See "Transmission Testing" procedure below.
6) Select ON hook to end the call. The E&M lamp extinguishes when the called party goes on hook.

Terminating A Call:

1) When the signaling circuit originates the call, the E&M lamp will light "red" to indicate that the E-lead is off hook.
   Note: If the trunk is set for "immediate dial", skip to step (03). If the trunk is set for "wink start", proceed with step (02).
2) After the E&M lamp lights, operate the momentary WINK switch. (This will cause the 710B to send M-lead off hook for 200mSec). Note: Operate the WINK switch within one second after the E&M lamp lights.
3) Adjust the test set VOLUME knob to hear DTMF or MF digits, or if Dial Pulse signaling is used, observe that the E&M lamp flashes as the digits are pulsed over the E-lead.
4) Select OFF hook to simulate answer supervision.
5) See "Transmission Testing" procedure below.
6) Select ON hook to end the call. The E&M lamp extinguishes when the calling party goes on hook.

Transmission Testing:

1) It is possible to perform transmission tests with the test set by switching from 4W DIAL/TALK into the MEASURE function. Select the NORM (normal) position.
2) If you wish to talk over the line under the test, switch the DIAL/TALK knob back to 4W, then depress the TALK button to speak and release the button to listen.

Model 710B Network Access Unit
with
Model 704A2 Wide Band Test Set

CXR Telcom Corporation
755 Ravendale Drive, Mountain View, CA 94043
(415) 965-7100 • Telex 284-684 • Fax (415) 965-9579

Rev. A **P/N 4200-0710-02**

2.3 710B Controls and Indicators

The front panel of a 710B Network Access Unit is shown in figure 2. The following description groups the controls and indicators as follows; Set-up, Supervision, Interface, and Power.

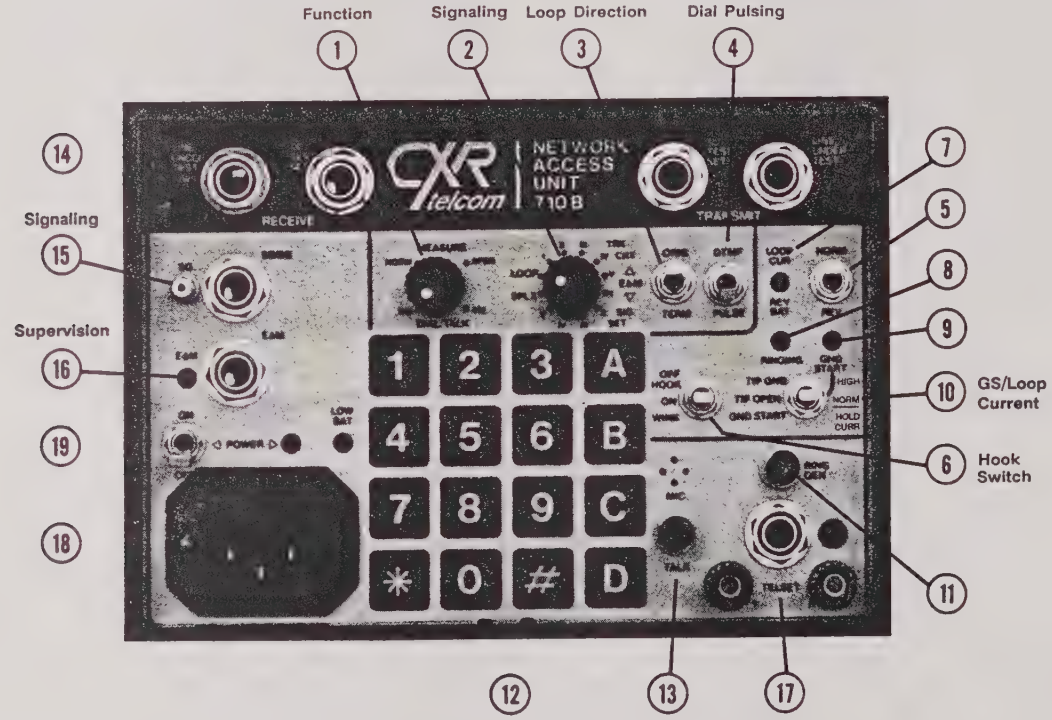


Figure 2. 710B Network Access Unit

Reference	Name	Function

Set-up Controls

1 **Function switch:** The DIAL/TALK positions enable the VF functions of the 710A; the MEASURE positions cut the Line pairs thru to the 701A for testing. In the NORM setting, a 2-wire line (LUT) is connected to the Receive jack of the associated test set; in the XFER position it is switched to the Transmit jack.

2 **Signaling type:** This switch is used to set-up the signaling options:

Loop signaling - ordinary 2-wire C.O. line.
Simplex signaling - loop signaling on a special service 4-wire C.O circuit.
E & M signaling, Trunk - emulates a trunk circuit of a switch. The M-lead transmits signaling and the E-lead receives signaling.
E & M signaling, Signaling Set - emulates a signaling set associated with a facility. E & M signaling is available in all five standard configurations.

Reference	Name	Function *(continued)*

3 **Loop direction:** In the ORIGINATE configuration, the 710B functions as station equipment (it can originate dialing). In the TERMINATE mode, it emulates network equipment (supplies battery). This switch is active for Loop and Simplex configurations.

4 **Dial pulsing:** Either standard DTMF tone dialing or dial pulsing is available. This function is fully active when the unit is configured for Loop or Simplex and Originating mode. Tone signaling is available at all times.

Supervision Controls and Indicators

5 **Battery polarity:** In the NORMAL position, negative battery is applied to the Ring lead. This is limited to 23 mA and is active only in the TERM mode. Battery may be reversed to simulate answer supervision on a loop-dial trunk.

6 **Hook-switch:** OFF-HOOK initiates a seizure towards a switch line circuit or on an E & M trunk. ON-HOOK releases a call. The WINK (momentary) position simulates a start-dial signal when the set is used in a TERM mode. It consists of a 200 msec E-lead Off-hook or battery reversal, depending on the configuration.

7 **Loop Current indicator:** Tri-state LED shows Green for normal loop current and Red for reversed battery. Current flow through the LED illuminates it, thus, approximately 20 mA must flow for a visible indication.

8 **Ringing indicator:** LED indicator shows the presence of ringing voltage on the loop. The threshold is approximately 70 VAC.

9 **Ground Start indicator:** Monitors the Ring lead for ground, i.e. differential current in Tip and Ring leads. Active in LOOP/SIMPLEX, TERMINATE modes.

10 **Ground Start and Holding Current control:** This switch has two distinct functions. In the ORIGINATE mode, it controls the holding current at either 20 mA (NORM), or 26 mA (HIGH). It is also used to initiate a call on a ground-start circuit by placing a ground (momentary) on the ring lead. In the TERMINATE mode, the switch controls the tip lead connection. TIP GND is the normal position, TIP OPEN is used at the beginning of a call sequence on a ground-start circuit.

11 **Ringing Generator:** Applies 20 Hz ringing voltage to the loop (TERMINATE mode). Sufficient power to drive a REN 3 load is available.

12 **Dial pad:** Conventional dial pad plus A,B,C,D tones are provided. (The latter are not used in network testing). Pulse dialing uses numeric keys.

13 **Talk:** Push to talk feature is active in all modes. Speech is picked up by internal microphone and coupled to line under test. Listen feature is provided by associated transmission test set.

Reference Name **Function** *(continued)*

Interface Section

14 **Line jacks:** Line jacks are wired T/R/S and are compatible with 310 type telephone plugs. The network access line is connected to the Line Under Test jacks and the transmission test set is connected to the Test Set jacks

15 **Signaling jacks:** These jacks are wired as follows:

Tip:	E	SG,
Ring:	M	SB

Note: Signaling ground may be provided to the unit via the SG lead (Ring) or the SG terminal. If the SB/SG jack is not in use, the third wire on the AC connector is connected to the internal ground via the normally-closed contacts.

16 **E/M indicator:** This red LED shows the status of incoming signaling. ON = off-hook, and OFF = on-hook. (For the TRUNK CIRCUIT mode, the M-lead is monitored; for the SIGNALING SET mode, the E-lead is monitored.

17 **Telset connection:** The Tip and Ring leads of the LUT (2W) jack are connected directly to this jack and also to the T/R terminals. This feature is used for monitoring with a butt-set.

Power

18 **Power connector:** The front panel AC connector fits a standard instrument power cord. The 710B is designed for operation from 120 VAC, 60Hz. The internal batteries are being charged when the unit is connected to AC power and the power switch is OFF.

19 **Power indicator:** This red LED is ON whenever the power switch is turned on, even if external AC is not connected.

Note: Some functions (ringing generator, Loop Terminate mode, Simplex operation, and E & M signaling) operate on AC power only.

2.5 Functional Description

Figures 4 to 6 depict the functional operation of the line interfaces of the 705B and 710B units.

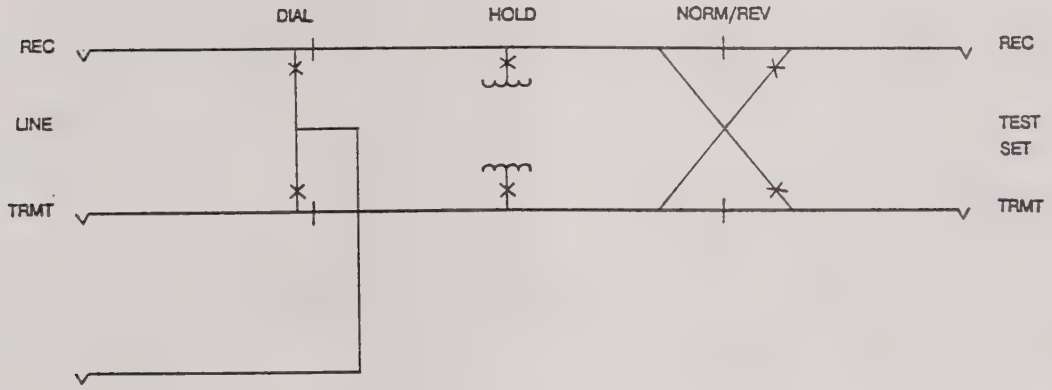


Figure 4. 705B Line Interface

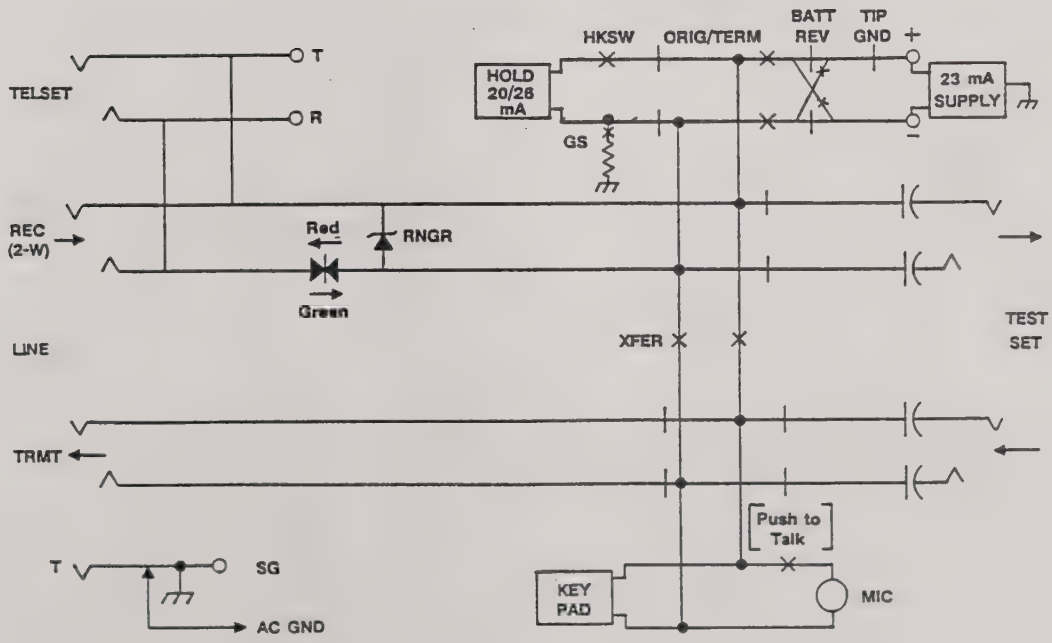


Figure 5. 710B Loop Functions

TYPE	STATE (ON/OFF HOOK)	
I	E:	open/gnd
	M:	gnd/batt
II	E:	open/SG (gnd)
	M:	open/SB (batt)
III	E:	open/gnd
	M:	SG (gnd)/SB (batt)
IV	E:	open/SG (gnd)
	M:	open/SB (gnd)
V	E:	open/gnd
	M:	open/gnd

ARRANGEMENT

SIGNALING SET TRUNK CIRCUIT

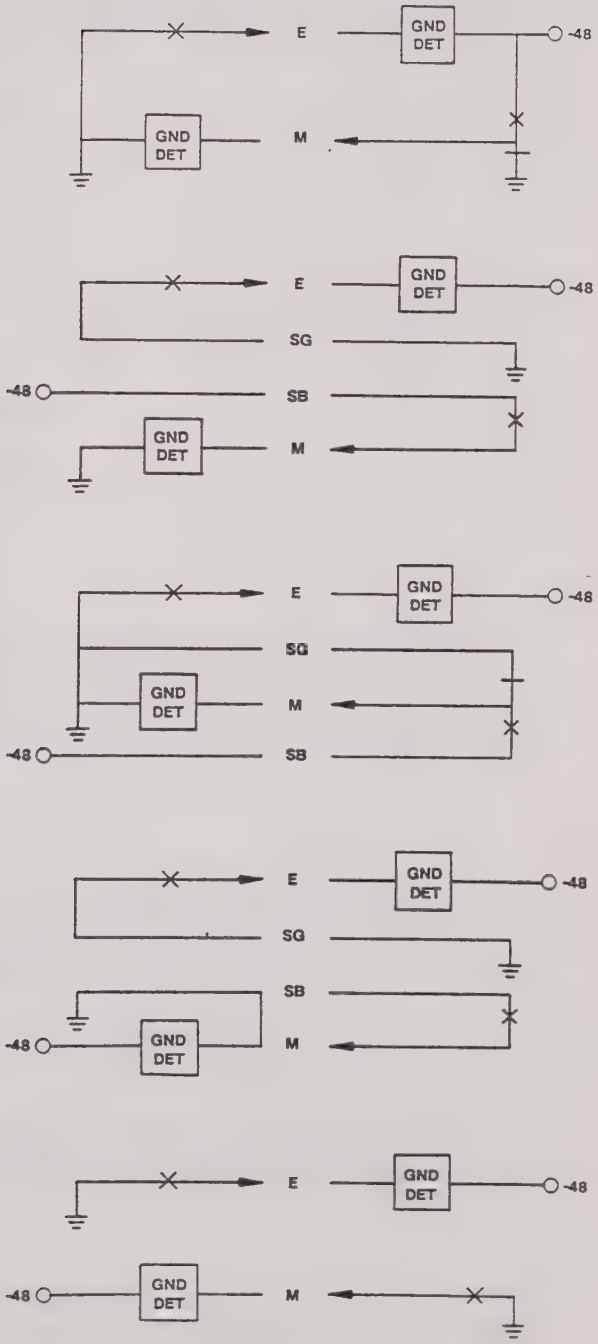


Figure 6. E & M Signaling

4 - NETWORK ACCESS PROCEDURES

The model 704A test set is equipped with a front cover which houses certain ancilliary functions. Use of the basic unit (model 705B) is described in section 4.5. The operation of the more complex model 710B is covered in sections 4.1 through 4.4. These sections describe the operation of the unit when accessing the following types of lines:

Loop Start or Ground Start (LS/GS) C.O. lines.
Direct Inward Dial (DID) lines
Trunks with E & M signaling

4.1 LS/GS, Emulating CPE (Equipment)

In this arrangement, the 710B acts as a telephone or PABX trunk circuit. Preset switches as follows:

Function	DIAL, 2/4 wire
Signaling	LOOP (2W) or SPLX (4W)
Loop direction	ORIG
Dial pulsing	DTMF or DP, as required
Hook-switch	ON HOOK
GS/current	NORM
Loop voltage	not used

Connect the 710B to the test set and to the line to be tested. **The 710B must be grounded properly, via the SB lead/terminal or by the AC line, in order to access a ground start line.**

Turn power ON, the POWER indicator should be illuminated. All two-wire loop tests in this group can be done using the internal rechargeable batteries.

Outgoing Call

1) Place the hook-switch in the OFF-HOOK position. A Loop Current (red) indication shows that the (LS) line has been seized. To seize a GS line, depress the loop current switch to the GRD START position momentarily. This places a resistance ground on the Ring lead.
2) If the line cannot be seized, place the loop current switch in the HIGH position. This raises the holding current from 20 mA to 26 mA.
3) Dial the test number and use the speaker in the TTS to monitor call progress.
4) If the C.O. provides answer supervision to the CPE, the Loop Current indicator will turn green to show reversed battery.
5) Place the function switch in the MEASURE/NORM position and proceed with testing. A two-wire line can be swapped from the Receiver to the Transmitter using the XFER position.
6) A dialed connection may be terminated by placing the hook-switch in the ON-HOOK position.

Incoming Call

1) Initiate a call to the line which is connected to the 710B.
2) The RINGING LED illuminates during the ringing cycle. (The 710B does not monitor for Tip ground which is provided by a ground-start line circuit).
3) Answer the call by placing the hook-switch in the OFF-HOOK position.
4) Testing may proceed with the function switch in the MEASURE position.

4.2 LS/GS, emulating C.O. (Line Circuit)

The 710B takes the place of the C.O., or other equipment, line circuit in this arrangement. Preset switches as shown: (Controls not listed are not used in this mode).

Function	DIAL, 2/4W	
Signaling	LOOP (two-wire only)	
Loop direction	TERM	
Loop battery	NORM	
GS/hold current	LS: TIP GND	GS: TIP OPEN

Connect 710B to the test set and to the line to be tested. A proper ground is neccessary for testing ground start circuits.

Outgoing Call (CPE to Network)

1) Operate the ground start control at a GS station. The GND START LED on the 710B lights.
2) Switch GS to TIP GND. This extinguishes the light.
3) Condition the station equipment to off-hook. This will draw loop current from the 710B, thus illuminating the LOOP CURRENT indicator (green)
4) Set the loop battery to REVERSE. The station equipment should recognize this as an answer supervision.
5) Select MEASURE/NORM to conduct transmission testing using the attached TTS. If this set does not have a port transfer function, use the MEASURE/XFER position to transmit on a 2-wire connection.

Incoming call (Network to CPE)

1) Set the GS switch to TIP GND. The station equipment should recognize this as a line seizure.
2) Operate the RING GEN key on the 710B to simulate ringing.
3) The LOOP CUR LED (green) will light when the station answers the call.
4) Set the Function switch to MEASURE and proceed with transmission testing.

4.3 Direct Inward Dialing Trunk

DID trunks tie a PBX directly into the national numbering plan since stations are dialed directly from outside (not intercepted by an attendant). Such trunks are one-way, incoming to the PBX, thus, are virtually identical to Loop Start lines except reversed in direction.

Emulate PBX

1) Preset switches as listed in section 4.2 (emulate Line Circuit, loop-start mode).
2) Seize trunk at C.O. end. Loop current indicator lights (red) to show normal current flow.
3) Send WINK to simulate start dial signal.
4) Set Loop polarity switch to REVERSE to simulate answer supervision.
5) Set the function switch to MEASURE and proceed with transmission testing.

Emulate C.O. Switch *(DID testing continued)*

1) Preset switches as listed in section 4.1 (emulate Station Equipment, loop-start mode).
2) Place the hook-switch in the OFF HOOK position. The loop current indicator lights (red) to show normal loop current.
3) Observe the momentary REVERSE battery signal (green) to show "wink" from PBX.
4) Dial the test number.
5) Observe answer supervision signal (green loop current indication).
6) Set function switch to MEASURE and proceed with transmission testing.

4.4 E & M Signaling

E & M signaling provides full-capability unidirectional signaling on tie trunks between PBX's. Of the five different arrangements shown in figure 6, Type I is the most common. Preset switches as follows:

Function	DIAL/TALK
Signaling	TRK CKT to emulate a switch, or SIG SET to emulate a facility terminal; Type I, II, III, IV, or V to match trunk
Dial Pulsing	As required
Hook-switch	ON HOOK

Connect the line and the test set to the 710B. Connect signaling jacks as required.

Outgoing Call

1) Initiate a call from the 710B by placing the hook-switch OFF HOOK.
2) Monitor the supervision light for far-end dial control (wink or stop-dial).
3) Dial the test number. The E & M supervision lamp will light to show answer supervision.
4) Set the function switch to MEASURE and proceed with transmission testing.
5) Terminate the call by placing the hook-switch ON HOOK.

Incoming Call

1) Monitor the E & M supervision light to show a seizure.
2) Operate the WINK switch if the trunk is set for wink-start. This must be completed within one second of trunk seizure.
3) Incoming pulsing may be observed (E/M) or heard on the test set speaker.
4) Select OFF HOOK to answer the call and proceed with transmission testing.
5) Terminate the call by placing the hook-switch ON HOOK.

Note: Signaling send and receive functions are associated with the E & M leads respectively when the unit is configured as a Signaling Set. The functions are reversed when the unit is set up as a Trunk Circuit.

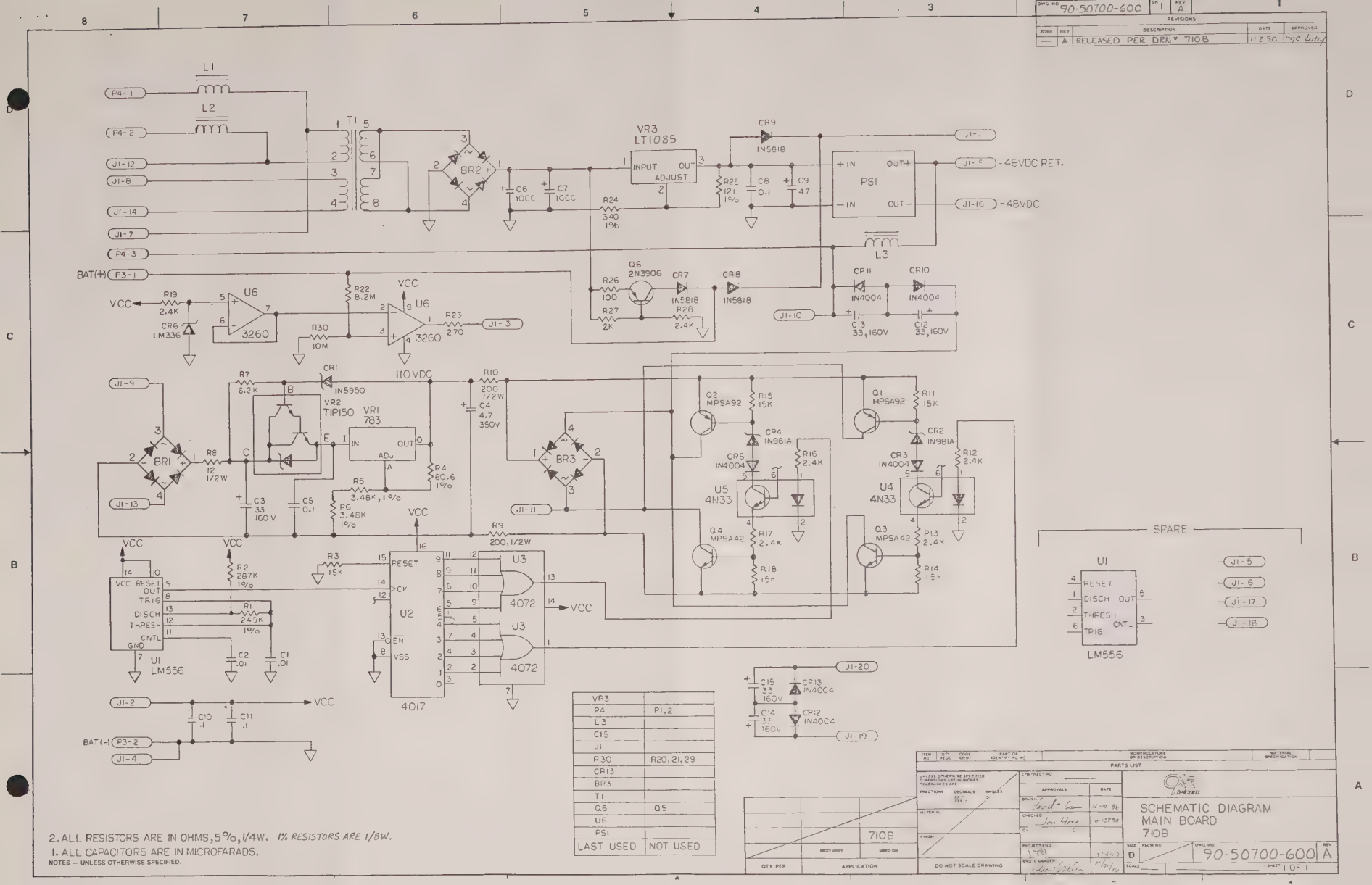
5.2 710B Network Access Unit

Interface		
	Loop signaling	2-wire, T/R 4-wire, simplex A/B leads derived from T/R AND T1/R1
	E & M signaling	Types I - V
Supervision		
	Loop	Loop start; ground start Originate or Terminate dialing
	E & M	Trunk circuit; signaling set
Dialing		
	Type	DTMF and pulse
	Pulse rate	10 pps, 60% break, 840 msec IDT
	DTMF	Standard tone pairs
	Keypad	DP; 0 - 9 DTMF; 0 - 9, *, #, A - D
Station Equipment Emulation		
	Holding current	Electronic control, 20 and 26 mA
Line Circuit Emulation		
	Loop battery	Electronic control, 23 mA
	Polarity	NORM: Ring (-) REV: Tip (-)
	Ring generator	20 Hz; 70 VAC; REN 3
Trunk Signaling		
	E & M supervision	- 22 = BATTERY
	Wink	200 msec
General		
	Size	5.1 x 7 x 2.2 inches
	Weight	2.8 pounds
	Battery	NiCd
	Recharge time	approximately 8 hours

5.3 705B Dial and Hold Unit

Hold coils	two, 660 Ohms
Power	none, passive unit
Size	5.1 x 7 x 2.2 inches
Weight	1.5 pounds

All specifications are subject to change without notice.



VR3	
P4	P1,2
L3	
C15	
J1	
R30	R20,21,29
CR13	
BR3	
T1	
Q6	Q5
U6	
PS1	
LAST USED	NOT USED

2. ALL RESISTORS ARE IN OHMS, 5%, 1/4W. 1% RESISTORS ARE 1/8W.
1. ALL CAPACITORS ARE IN MICROFARADS.
NOTES — UNLESS OTHERWISE SPECIFIED.

DWG NO	SH	REV
90-50700-600	1	A

REVISIONS

ZONE	REV	DESCRIPTION	DATE	APPROVED
—	A	RELEASED PER DRN # 7108	11 2 90	mjc

PARTS LIST

ITEM NO	QTY PER	CODE IDENT	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION

QTY PER	APPLICATION	7108 NEXT ASSY	USED ON

DO NOT SCALE DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE	APPROVALS	DATE
FRACTIONS ±	DRAWN	
DECIMALS ±	CHECKED	
ANGLES ±	MATERIAL	
FINISH	PROJECT ENG	
	ENG LANGER	11/01/11

CONTRACT NO

QNE telecom

SCHEMATIC DIAGRAM
MAIN BOARD
7108

SIZE	FSCM NO	DWG NO	REV
D		90-50700-600	A

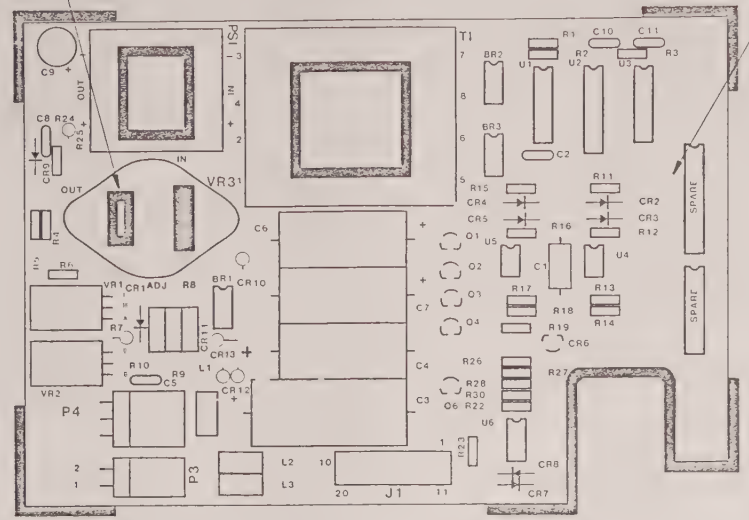
SCALE | SHEET 1 OF 1

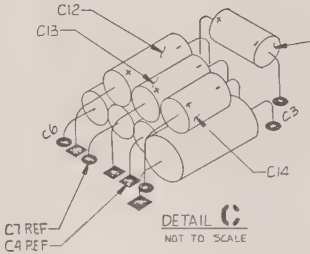
DWG NO	REV
23-50700-600	A4

REVISIONS

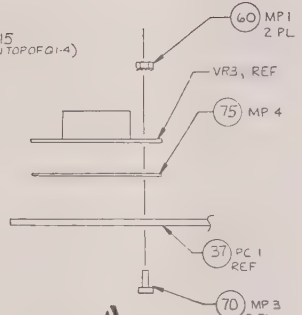
ZONE	REV	DESCRIPTION	DATE	APPROVED
	A3	PROD REL PER ECO #6525	18 JAN 90	TON HOAG
	A4	REDRAWN PER ECO #6712	10/16/90	mjc Lutz

COMPONENT SIDE

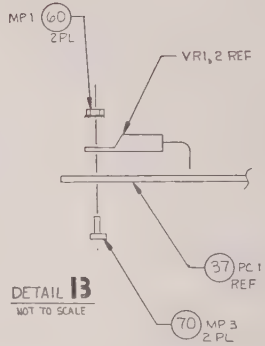




DETAIL C
NOT TO SCALE



DETAIL A
NOT TO SCALE



DETAIL B
NOT TO SCALE

DETAIL D
NOT TO SCALE

DETAIL E
NOT TO SCALE

6. LOAD C12-15 PER DETAIL C.
5. LOAD CR10-13 PER DETAIL E.
4. LOAD R7 AND R25 PER DETAIL D.
3. STAMP CURRENT REVISION WHERE SHOWN.
2. FOR SCHEMATIC SEE 90-50700-600.
1. SEE SEPARATE BILL OF MATERIAL 23-50700-600.

NOTES — UNLESS OTHERWISE SPECIFIED

9 ADHERE 2" x 2" SQUARE OF MP2 (44-50003-250) TO TOP OF VR3.

8. LOAD VR3 PER DETAIL A.
7. LOAD VR1,2 PER DETAIL B.

PARTS LIST

ITEM NO	QTY REQD	CODE IDENT	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION

		710B	
QTY PER	NEXT ASSY	APPLICATION	USED ON

DO NOT SCALE DRAWING

CONTRACT NO

APPROVALS	DATE
DRAWN PKFISHER	9-4-90
CHECKED JON HOAG	10-8-87
QA	
PROJECT ENG	
ENG MANAGER	

CXR Telecom
821 CHARCOT AVENUE
SAN JOSE, CALIFORNIA 95131

PCB ASSY
MAIN BOARD, 710B

SIZE	FSCM NO	DWG NO	REV
D		23-50700-600	A4

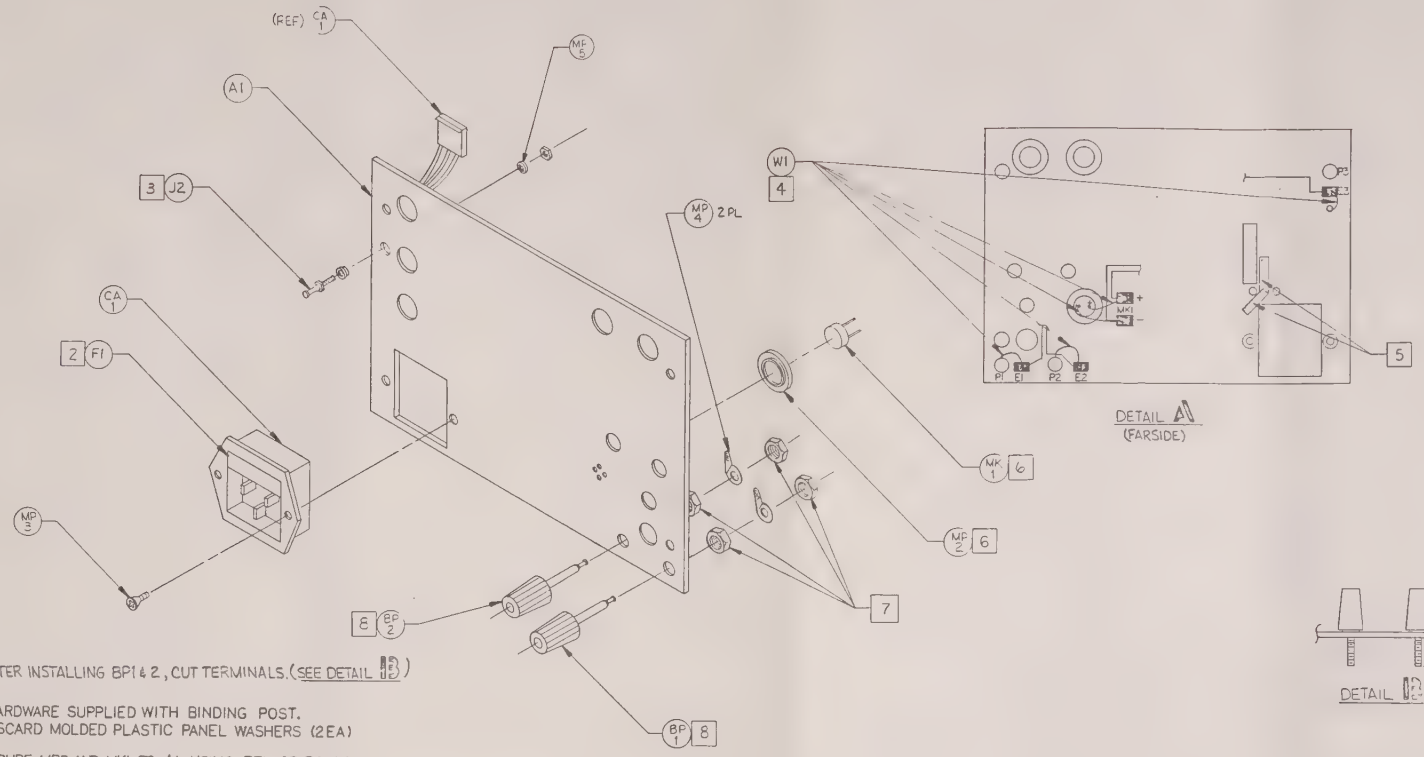
SCALE 2:1 SHEET 1 OF 1

ASSEMBLY	LEVEL	ITEM	COMPONENT	REV	'Q'	DESCRIPTION	QNTY	U/M	REFERENCE DESIGNATORS/ECOS
23-50700-600				A4		M PCB ASSY MAIN BD, 710B	1	EA	
	04	40	30-00244-01C	G		COIL-FXD RF 1000 UH,10,SHIEL	2	EA	L1,2 REV A, ECO 2870, 01/27/88
	04	43	30-00245-01C	B		CHOKE-FERRITE 2-1/2TURNS	1	EA	L3 REV A1, ECO 3081, 03/13/89
	05	260	30-00246-01C	A		XFMR-PWR,115/230V-6.3VAC '.9	1	EA	T1 REV A2, ECO 6491, 09/89/89
	04	55	34-00226-020	9		CONN,20 PIN PC MTG	1	EA	J1 REV A3, ECO 6525,
	04	45	34-00222-020			CONN,HDR,2PIN RA .156 CTRS T	1	EA	P3 REV A4, ECO 6712, 10/15/90,
	04	50	34-00222-030			CONN,HDR,3PIN RA .156 CTRS T	1	EA	P4
	04	110	39-00026-010			PWR SPLY,+5V,1N,-48V OUT DC-	1	EA	PS1
	06	75	42-00257-010			TRANSISTOR-INSULATOR PAD TO-	1	EA	MP4
	05	37	43-50700-600			PCB FAB MAIN BD,710B	1	EA	PC1
	07	265	44-50003-250	A		INSULATOR MOTHER BRD 803 D	1	EA	MP2
	05	70	50-44005-110			SCREW-PH,PHIL,4-40,.312LG D	4	EA	MP3
	06	60	51-44000-010			KEPNUT,4-40X.098,STEEL D	4	EA	MP1
	05	240	60-04004-010	2		DIODE 1N4004	6	EA	CR3,5,10-13
	07	245	60-05818-010			DIODE,1N5818 1A,30V,SCHOTTKY	3	EA	CR7-9
	04	235	61-00981-110			DIODE,1N981A 68V,ZENER	2	EA	CR2,4
	05	250	61-05950-010			DIODE,ZENER,1N5950,11V,1.5W	1	EA	CR1
	04	210	62-00037-010			XSTR,MPSA42 NPN,300V,500MA	2	EA	Q3,4
	05	230	62-00038-010			ISTR,TIP150,NPN,300V,10A	1	EA	VR2
	04	215	63-00022-010			XSTR,MPSA92 PNP,300V,500MA	2	EA	Q1,2
	07	225	63-03906-010	0		XSTR,2N3906,PNP (TO-92)	1	EA	Q6
	04	255	64-00113-010			DIODE,BRIDGE,1A,400V,4PIN,DI	3	EA	BR1-3
	04	88	65-00037-010			IC,LM336B,2.5V,REF DIODE TO-	1	EA	CR6
	04	95	65-00038-010			IC,783 REGULATOR ADJSTBL,125	1	EA	VR1
	04	105	65-00039-010			IC,3260 LINEAR BIMOS OP AMP	1	EA	U6
	04	85	65-00114-010			IC,LT1085CK VOLT REG,ADJ(TO-	1	EA	VR3
	05	90	65-00556-010	6		IC,DUAL TIMER CIRCUIT,556	1	EA	U1
	04	80	66-04017-030			IC,4017 DECADE COUNTER/DIVID	1	EA	U2
	04	82	66-04072-030			IC,4072B DUAL 4-INPUT OR GAT	1	EA	U3
	04	100	69-00444-010			IC,4N33 DARLINGTON OPTO-ISOL	2	EA	U4,5
	04	115	70-01012-110	3		RES CF 100 05 1/4W D	1	EA	R26
	04	160	70-01062-110	3		RES 10MEG,5,1/4W D	1	EA	R30
	05	165	70-01202-210			RES,CC,12,5,1/2W D	1	EA	R8
	04	150	70-01532-110	3		RES CF 15K 05 1/4W D	5	EA	R3,11,14,15,18
	05	170	70-02012-210			RES,CC,200,5,1/2W D	2	EA	R9,10
	07	125	70-02022-110	3		RES CF 2K 05 1/4W D	1	EA	R27
	04	135	70-02422-110	3		RES CF 2.4K 05 1/4W D	6	EA	R12,13,16,17,19,28
	04	123	70-02712-110	3		RES CF 270 05 1/4W D	1	EA	R23
	04	145	70-06222-110	3		RES CF 6.2K 05 1/4W D	1	EA	R7
	04	155	70-08252-110	3		RES 8.2M 5% 1 1/4 W D	1	EA	R22
	04	180	72-12105-010			RES,MF,121,1,1/8W D	1	EA	R25
	04	200	72-24935-010	5		RES MF 249K 01 1/8W D	1	EA	R1
	04	205	72-28735-010	5		RES MF 287K 01 1/8W D	1	EA	R2
	05	182	73-34005-010	5		RES,MF, 340 OHM, 1/8W 1PERCE D	1	EA	R24
	04	185	72-34815-010	5		RES MF 3480 01 1/8W D	2	EA	R5,6
	04	175	72-80685-010			RES,MF,80.6,1,1/8W D	1	EA	R4
	04	15	81-00009-010	F		CAP,MET POLY,.01UF,1,200V	1	EA	C1
	05	13	82-00027-010			CAP,CER,DIP,.1UF,10,200V	1	EA	C5
	04	5	82-01034-210	1		CAP CER .01UF 10 100V	1	EA	C2
	04	10	82-01044-110	3		CAP CER .1UF 10 50V	3	EA	C8,10,11
	04	20	86-00020-010	E		CAP,ALU,33UF,-10+50,160V	5	EA	C3,12-15

ASSEMBLY	LEVEL	ITEM	COMPONENT	REV	'Q'	DESCRIPTION	QNTY	U/M	REFERENCE DESIGNATORS/ECOS
23-50700-600				A4		M PCB ASSY MAIN BD, 710F	1	EA	
	05	25	86-00021-010	C		CAP,ALU,4.7UF,-10+75,350V	1	EA	C4
	05	35	86-00022-010	E		CAP,ALU,47UF,-10+50,25V,RADI	1	EA	C9
	05	36	86-00023-010			CAP,ALU,100CUF,20,16V,AXIAL	2	EA	C6,7

PSRV99-END OF JOB

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED
	A	PROTOTYPE REL. PER ECO # 2555	12-10-86	Jim Hong
	A1	SHIPPED		
	A2	REVISED PER ECO # 6519	20DEC89	Jim Hong



DETAIL A (FARSIDE)

DETAIL B

.40 ± .05

8 AFTER INSTALLING BP1 & 2, CUT TERMINALS. (SEE DETAIL B)

7 HARDWARE SUPPLIED WITH BINDING POST.
DISCARD MOLDED PLASTIC PANEL WASHERS (2EA)

6 SECURE MP2 AND MK1 TO A1 USING RTV OR EQUIV.

5 ADD MYLAR (MP1) 2PL WHERE SHOWN.

4 AFTER INSTALLING J2; BP1,2; & MK1, ADD JUMPERS, 5PL (USING W1, LENGTH A/R), AS SHOWN IN DETAIL A. CONNECT E1,2 TO MP4 (2PL).

3 HARDWARE IS SUPPLIED BY VENDOR.

2 REMOVE FUSE HOLDER, INSERT FUSE (F1) AND REPLACE FUSE HOLDER

1 SEE SEPARATE LIST OF MATERIALS.

NOTES — UNLESS OTHERWISE SPECIFIED:

ED-0700-35

ITEM NO.	QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION
				PARTS LIST	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE
FRACTIONS ± | DECIMALS .XX ± .XXX ± | ANGLES ±
MATERIAL 1
FINISH

CONTRACT NO

APPROVALS	DATE
DRAWN [illegible]	11/24/86
CHECKED Jim Hong	12-10-86
QA	
PROJECT ENG [illegible]	2/1/87
ENG MANAGER [illegible]	2/1/87

HALCYON
2121 ZANKER ROAD
SAN JOSE, CALIFORNIA 95131

FRONT PANEL ASSY
710B

SIZE	FSCM NO	DWG NO	REV
D		26-50700-350	A2

SCALE NONE SHEET 1 OF 1

QTY. PER	NEXT ASSY	USED ON
APPLICATION		710B

DO NOT SCALE DRAWING

8 7 6 5 4 3 2 1

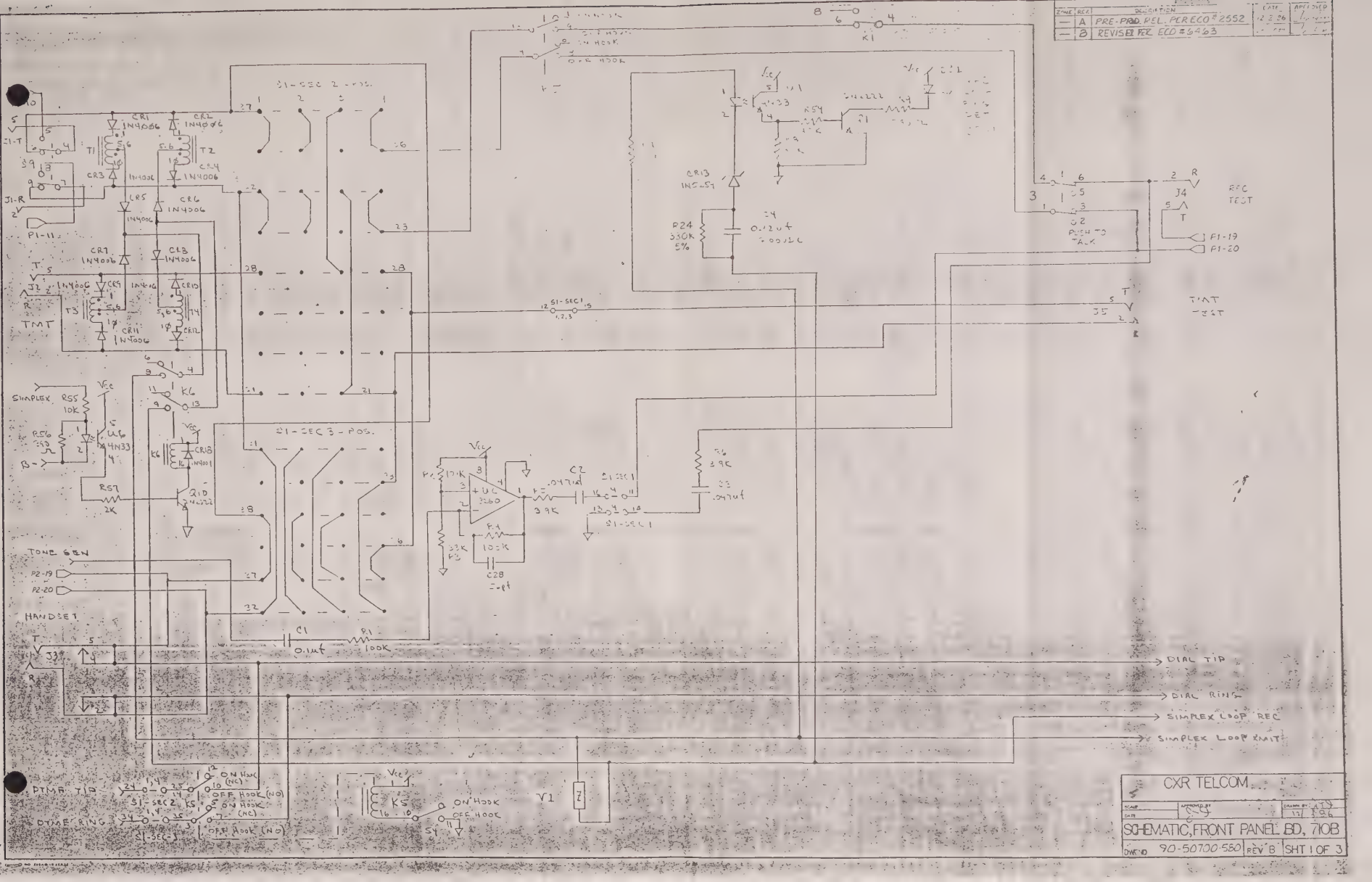
CXR TELCOM CORPORATION
REPORT NO. MPSU020

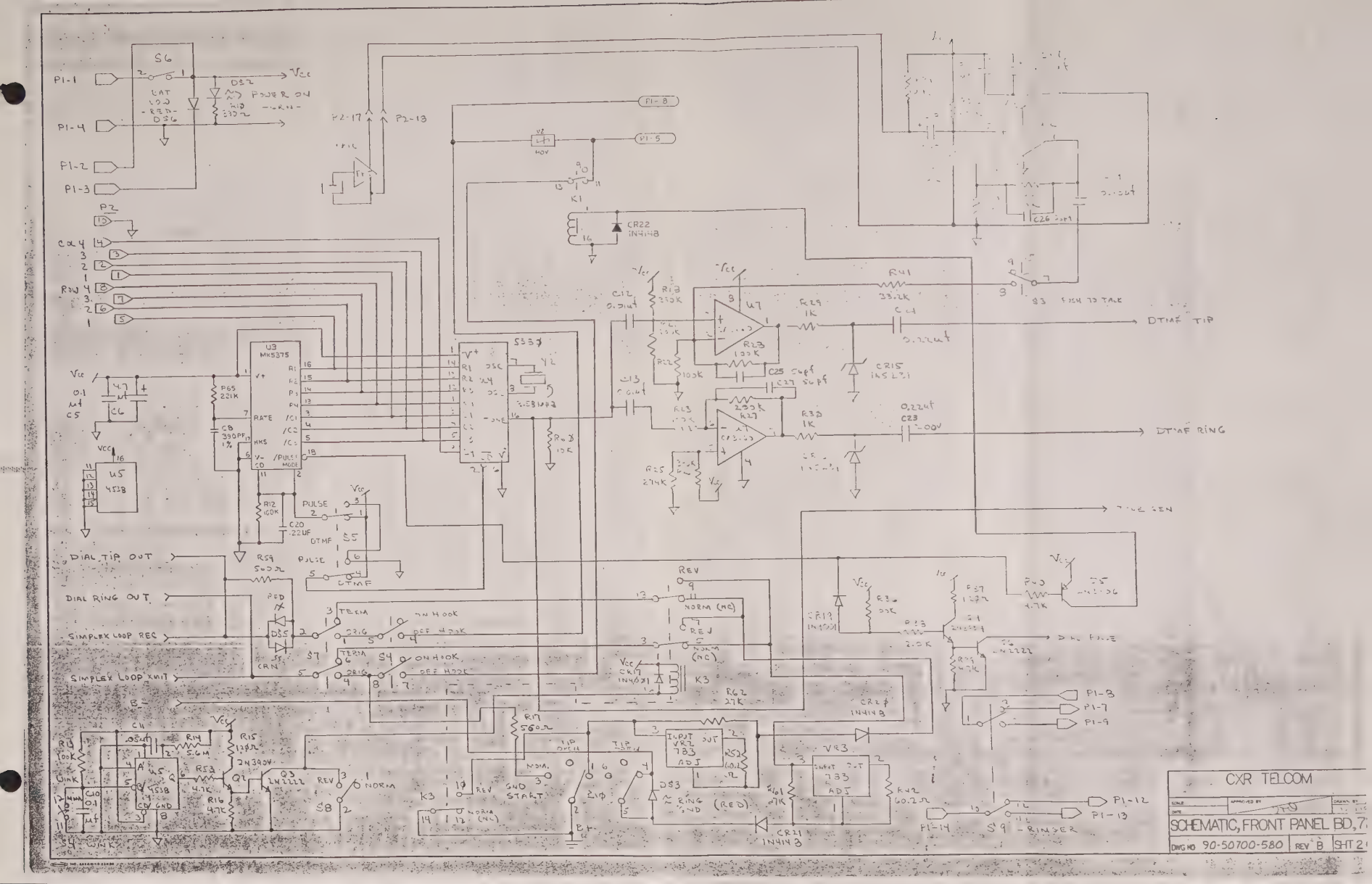
SINGLE LEVEL BILL OF MATERIAL

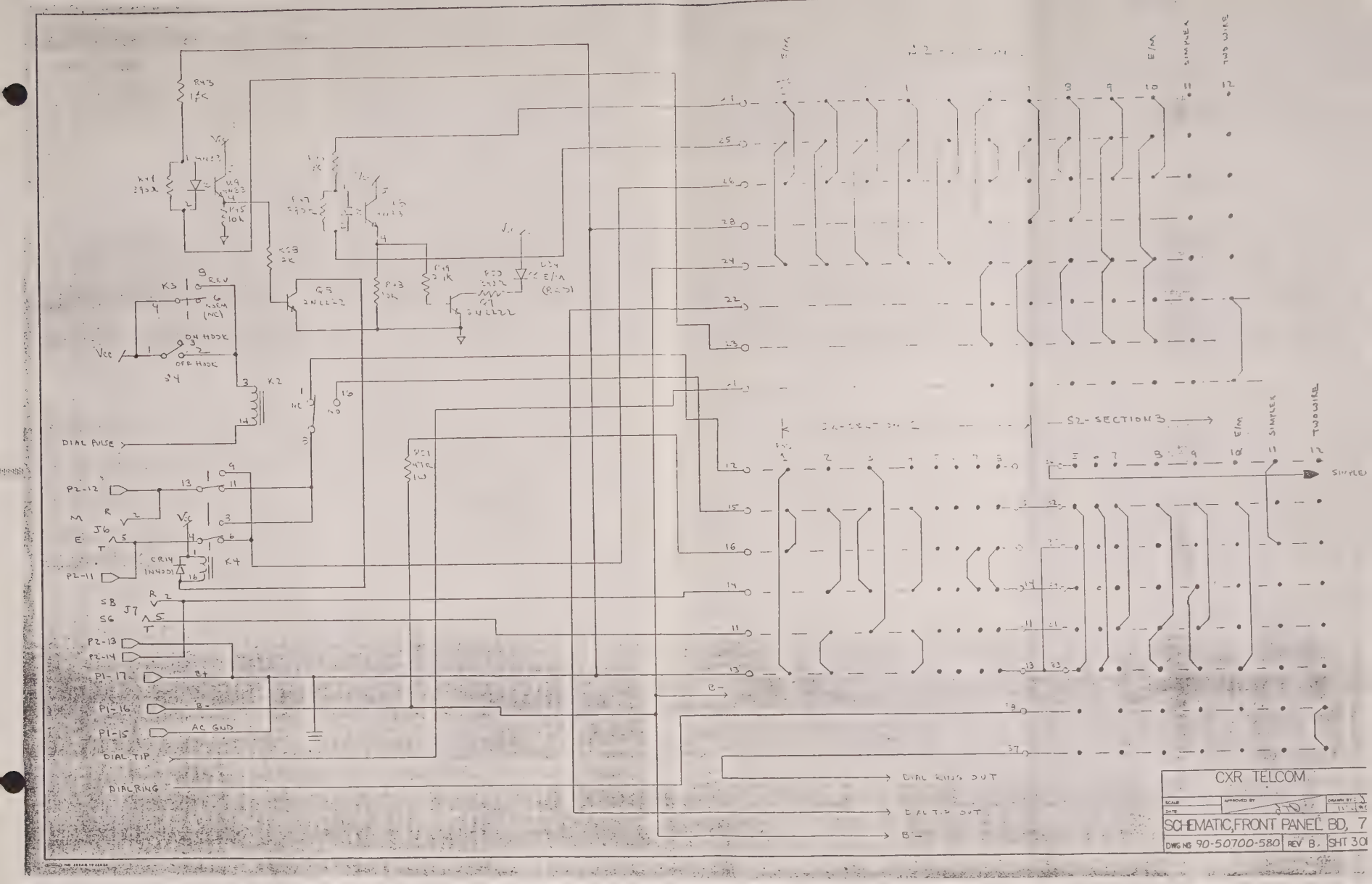
DATE 10/30/89
PAGE 1

ASSEMBLY	LEVEL	ITEM	COMPONENT	REV	'Q'	DESCRIPTION		QNTY	U/M	REFERENCE DESIGNATORS/ECOS
26-50700-350				A2	Q	M FRONT PANEL ASSY 710B		1	EA	
	03	50	25-50700-120	X2		CABLE-ASSY AC POWER,710		1	EA	CA1 REV X1, ECO 2531, 10/20/85
	03	35	33-00270-020			FUSE-CART 125MA 250V FAST		1	EA	F1 REV A, ECO 2579, 01/30/87
	04	5	35-00029-010			MICROPHNE-ELECTRET CONDSR.2-1		1	EA	MK1 REV A1, ECO 2555, 02/04/87
	07	40	37-26999-230			WIRE-KYNAR 26 AWG SOLID WHIT	D	5	IN	W1 OBS ECO 2941, 04/15/88
	07	15	44-50003-250	A		INSULATOR MOTHER BRD 803	D	1	EA	MP1 REV A2, ECO 6519, 10/27/89 Jon Hoag
	03	20	45-50700-330	C		KEYBOARD LABEL ASSY 710B		1	EA	A1
	07	32	50-00067-010			SCREW-BH,SLOT,NY,4-40,.375LG	D	2	EA	MP4
	03	30	50-63206-340			SCREW-FH,82,PHIL,BO,6-32,.37	D	1	EA	MP3
	03	25	52-00039-010			WASHER,SHLDR NY,.625OD,.380I	D	1	EA	MP2
	05	45	52-60000-030			WASHER-INT,TOOTH,CD,=6,.290O	D	1	EA	MP5
	03	7	53-00142-020			BINDING POST-15A,SLDR TERM,R		1	EA	BP1
	03	8	53-00142-040			BINDING-POST,15A,SLDR,TERM,G		1	EA	BP2
	03	10	53-00143-010			TERMINAL-FEEDTHRU =5-40 INS.		1	EA	J2

PSRV99-END OF JOB


ZONE | REV | DESCRIPTION | DATE | APPROVED
— | A | PRE-PROD. REL. PER ECO # 2552 | 12 2 86
— | B | REVISED PER ECO # 6463
S1-SEC 2 - POS.
S1-SEC 3 - POS.
S1-SEC 1
CR1 IN4006
CR2 IN4006
CR3 IN4006
CR4 IN4006
CR5 IN4006
CR6 IN4006
CR7 IN4006
CR8 IN4006
CR9 IN4006
CR10 IN4006
CR11 IN4006
CR12 IN4006
CR13 IN5257
T1
T2
T3
J1-T
J1-R
J2-T
J2-R
P1-11
P1-19
P1-20
J3
J4
J5
T-MAT
T-MAT TEST
RFC TEST
PUSH TO TALK
ON HOOK
OFF HOOK
K1
K2
K3
K4
K5
K6
SIMPLEX
RS5 10K
RS6 330
RS7 2K
Q1 2N4033
Q2 2N4033
Q3 2N4222
Q4 2N4222
Q5 2N4033
Q6 4N33
Q7 2N4222
Q8 2N4222
Q9 2N4222
Q10 2N4222
R1 100K
R2 17.1K
R3 33K
R4 10.1K
R5 10K
R6 2.9K
R7 3.9K
R8 330K 5%
R9 1K
R10 1K
R11 1K
R12 1K
R13 1K
R14 1K
R15 1K
R16 1K
R17 1K
R18 1K
R19 1K
R20 1K
R21 1K
R22 1K
R23 1K
R24 330K 5%
C1 0.1uf
C2 .047uf
C3 .047uf
C4 0.12uf 400VDC
C28 .1uf
U1 LM339
U2 LM339
U3 LM339
U4 LM339
U5 LM339
U6 4N33
TONE GEN
HANDSET
P2-19
P2-20
DIAL TIP
DIAL RING
SIMPLEX LOOP REC
SIMPLEX LOOP XMIT
PTMR TIP
PTMR RING
S1-SEC 2
S1-SEC 3
S1-SEC 1
S4
S5
V1
Z
CXR TELCOM
SCHEMATIC, FRONT PANEL BD, 710B
DWG NO 90-50700-550 REV B SHT 1 OF 3


S6
P1-1
P1-4
P1-2
P1-3
DS2
POWER ON
Vcc
P2-17
P2-13
P1-8
P1-5
K1
CR22
IN4148
U3
MK5375
U5
4538
U7
U4
5534
Y2
PULSE
DTMF
S5
DIAL TIP OUT
DIAL RING OUT
SIMPLEX LOOP REC
SIMPLEX LOOP XMIT
S7
S4
ON HOOK
OFF HOOK
TERM
DS5
CR7
K3
REV
NORM (NC)
S8
S9 - RINGER
DTMF TIP
DTMF RING
VOICE SEN
PULSE
SIDE TONE
FSK TO TALK
VR2
VR3
CR21
IN4148
CR22
IN4148
CR13
IN4001
CR17
IN4001
Q1
2N3904
Q2
2N2222
Q3
2N2222
CXR TELCOM
SCHEMATIC, FRONT PANEL BD, 7
DWG NO 90-50700-580
REV B
SHT 2

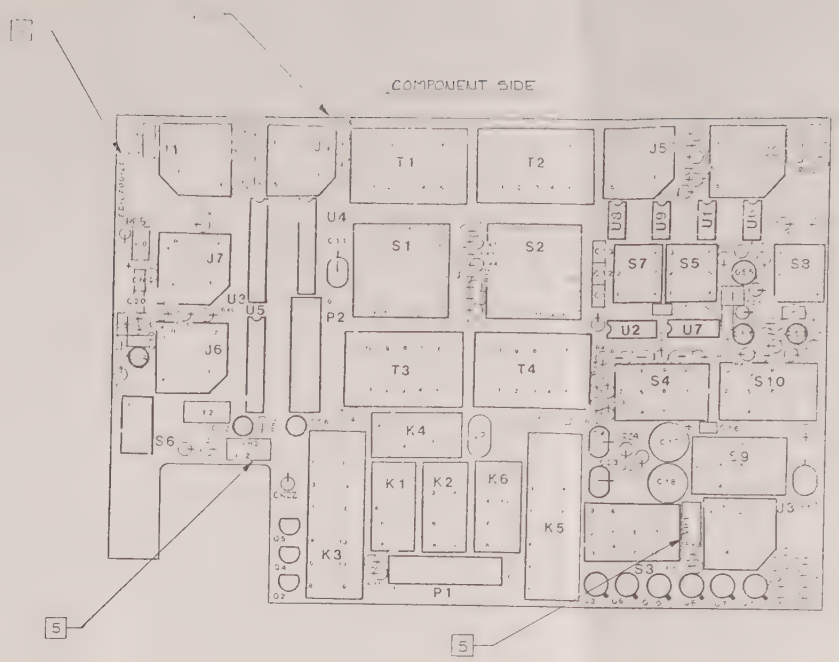


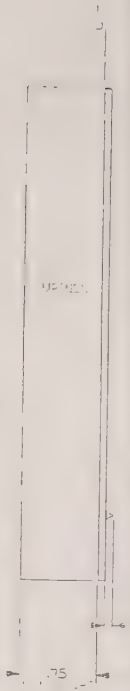
CXR TELCOM

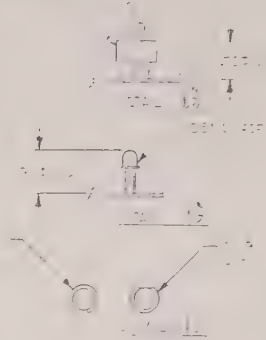
SCALE	APPROVED BY	DRAWN BY
DATE		

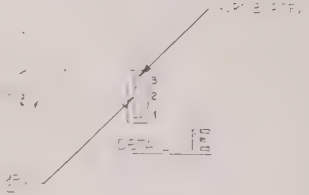
SCHEMATIC, FRONT PANEL BD, 7

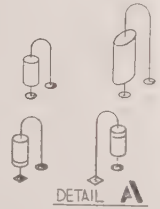
DWG NO 90-50700-580 | REV B | SHT 30











10. SOLDER W1 TO V2 (ONE WIRE PER LEAD) ON SOLDER SIDE OF BOARD.
9. SWITCHES (S3-10) TO BE PERPENDICULAR TO SURFACE [C] ±½°.
8. INSTALL SWITCHES PER DETAIL [D] AND LEDS PER DETAIL [C].
[7] ORIENT S4-8, &10 WITH KEYWAY TO EDGE [A] } SEE DETAIL [D].
ORIENT S3&9 WITH FLAT TO EDGE [B] }
6. INSTALL RESISTORS (EXCEPT R51), DIODES, AND CAPS PER DETAIL [A].
[5] INSTALL VR2&3 AND ADD MYLAR (MP2) AS SHOWN IN DETAIL [E].
[4] CHANGE "-26" TO "-58" AND STAMP CURRENT MAT'L LIST REV. WHERE SHOWN.
3. SQUARE PAD DENOTES CATHODE OF DIODE, POSITIVE END OF CAP, EMITTER OF TRANSISTOR, OR GATE OF FET.
2. FOR SCHEMATIC SEE 90-50700-580.
[1] FOR LIST OF MATERIALS SEE 23-50700-530.

NOTES — UNLESS OTHERWISE SPECIFIED

ED-0700-58

QTY PER	APPLICATION	DO NOT SCALE DRAWING	PCB ASSEMBLY FRONT PANEL BOARD-70B
	70B		D 95-50700-580 B
			SCALE NONE SHEET 1 OF 1

CXR TELCOM CORPORATION
REPORT NO. MPSU020

SINGLE LEVEL BILL OF MATERIAL

DATE 10/02/89
PAGE 1

ASSEMBLY	LEVEL	ITEM	COMPONENT	REV 'C'	DESCRIPTION		QUTY	U/M	REFERENCE DESIGNATORS/ECOS
23-5700-580				B	M PCB ASSY-FRONT PANEL BD,710B		1	EA	
	C5	75	30-00247-010		XTAL,-3.579545MHZ,.005,PARHC		1	EA	Y2 REV A; ECO 2870, 01/21/88
	05	295	32-00648-010		XFMR-LINE COUPLING,900-900		4	EA	T1-4 REV B; ECO 6463, 07/13/89 Jm Hoag
	05	125	32-00663-010		RELAY,PC FORM 2C,5V,167,SEAL		3	EA	K1,4,6
	05	128	32-00664-010		RELAY,PC FORM 1C,5V,SPST,320		1	EA	K2
	05	130	32-00665-010		RELAY,5VDC,4C,2AMP,125,PC MT		2	EA	K3,5
	05	265	33-00275-010		SW-PUSHBUTTON,MOM,4PDT,PC MT		2	EA	S3,9
	07	270	33-00276-030		SW-TOGGLE SPDT FLAT BAT WW		1	EA	S6
	05	275	33-00277-010		SW-SHORT TOGGLE,DPDT,WW		3	EA	S5,7,8
	05	280	33-00278-010		SW-SHORT TOGGLE,4P,ON-OFF-ON		2	EA	S4,10
	05	285	33-00279-010		SW-ROTARY,8 POLE,4POS,PC MT		1	EA	S1
	05	290	33-00280-010		SW-ROTARY,6 POLE,12POS,PC MT		1	EA	S2
	07	62	34-00216-030	4	SOCKET IC 18 PIN		1	EA	XU3
	05	65	34-00220-020	9	CONN,20 PIN PC MTG		1	EA	P1
	06	55	34-00447-010		CONN,TEL,JACK 2 CLOSED CIRCU		1	EA	J3
	07	60	34-00448-010		CONN,TEL,JACK 3 OPEN CIRCUIT		6	EA	J1,2,4-7
	05	70	34-00449-010		CONN,PC RCPTL,2X10POS,.1X.1S		1	EA	P2
	05	301	37-00018-010		WIRE-TWIST 2X24AWG 7X32 BLK/ D		12	IN	W1
	05	55	43-00700-250	B	PCB FAB-FRONT PANEL BD,710B		1	EA	PC1
	07	90	44-00063-250	A	INSULATOR MOTHER BRD 803		1	EA	MP2
	07	240	60-04001-010	2	DIODE 1N4001		4	EA	CR14,17-19
	05	245	60-04004-010	2	DIODE 1N4004		14	EA	CR1-12,20,21
	07	246	60-04148-010	1	DIODE 1N4148		1	EA	CR22
	05	250	61-05231-010		DIODE,ZENER,1N5231,5.1V,20MA		2	EA	CR15,16
	05	255	61-05254-210		DIODE,ZENER,1N5254,27V,500M		1	EA	CR13
	06	225	62-02222-110		XSTR,NPN,2N2222A		6	EA	Q1,3,6-8,10
	07	230	62-03904-010	0	XSTR 2N3904		2	EA	Q2,4
	07	235	62-03906-010	0	XSTR 2N3906		1	EA	Q9
	05	87	64-00074-010	1	LED,T1-3/4,1.8V,50MA,RED		5	EA	D61-4,6
	07	85	64-00111-010		LED T1 3/4 RED/GREEN .75 LE		1	EA	D62
	06	100	65-00038-010		IC,783 REGULATOR ADJSTBL,125		2	EA	VR2,3
	05	110	65-00039-010		IC,3260 LINEAR BIMOS OP AMP		2	EA	U2,7
	05	115	65-00040-010		IC,5375 TEN NO. REPERTORY DI		1	EA	U3
	05	120	65-00041-010		IC,5360 INTEGRATED TONE DIAL		1	EA	U4
	05	98	66-00032-010		IC,74HC4538 DUAL RETRIGG 1-S		1	EA	U5
	05	105	69-00044-010		IC,4N33 DARLINGTON OPTO-ISOL		4	EA	U1,6,8,9
	07	145	70-01022-110	3	RES CF 1K 05 1/4W	D	2	EA	R29,30
	07	165	70-01036-110	3	RES CF 10K 05 1/4W	D	6	EA	R45,45,46,48,59,60
	07	175	70-01046-110	3	RES CF 100K 05 1/4W	D	3	EA	R31,32,36
	05	140	70-01212-110	3	RES CF 120 05 1/4W	D	2	EA	R35,37
	07	170	70-01532-110	3	RES CF 15K 05 1/4W	D	1	EA	R7
	07	150	70-02022-110	3	RES CF 2K 05 1/4W	D	4	EA	R51,55,57,58
	07	153	70-02722-110	3	RES CF 2.7K 05 1/4W	D	2	EA	R15,49
	07	172	70-02732-110	3	RES CF 27K 05 1/4W	D	1	EA	R61,62
	06	178	70-03342-110	3	RES CF 33CK 05 1/4W	D	1	EA	R24
	07	142	70-03912-110	3	RES CF 390 05 1/4W	D	7	EA	R9,10,17,44,47,52,56
	05	155	70-03922-110	3	RES CF 3.9K 05 1/4W	D	3	EA	R5,6,41
	07	180	70-03942-110	3	RES CF 390K 05 1/4W	D	2	EA	R16,26
	05	185	70-04702-210		RES,CC,47,5,1/2W	D	1	EA	R50
	07	160	70-04722-110	3	RES CF 4.7K 05 1/4W	D	6	EA	R3,18,39,40,53,54
	06	143	70-05612-110	3	RES CF 560 05 1/4W	D	1	EA	R33

CXR TELCOM CORPORATION
REPORT NO. MPSU020

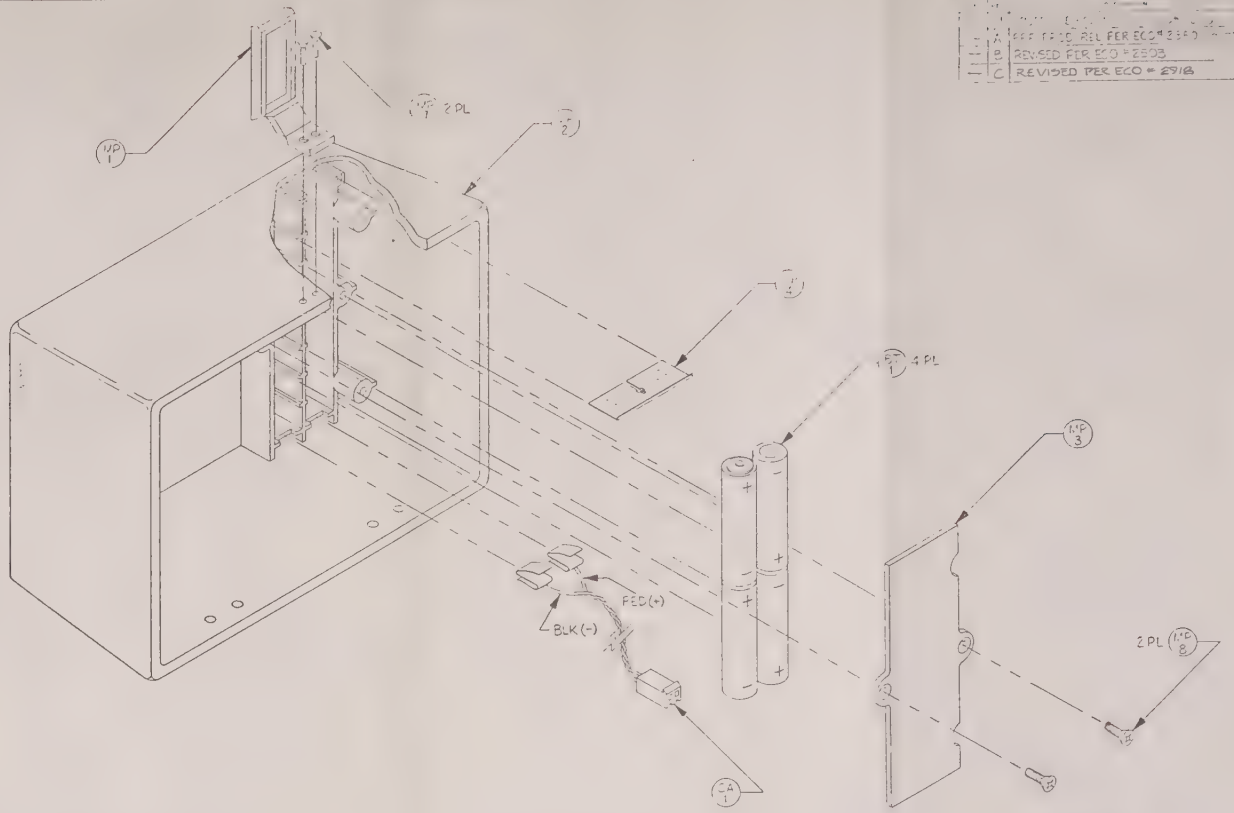
SINGLE LEVEL BILL OF MATERIAL

DATE 10/02/83
PAGE 2

ASSEMBLY	LEVEL	ITEM	COMPONENT	REV	'C'	DESCRIPTION		QNTY	U/M	REFERENCE DESIGNATORS/ECOS
23-50700-580				B		M PCB ASSY-FRONT PANEL ED,7108		1	EA	
	05	183	70-05052-110			RES,CC,5.6M,5,1/4W	D	1	EA	R14
	07	192	72-10025-010	5		RES MF 10K 01 1/8W	D	2	EA	R33,34
	06	195	72-10035-010	5		RES MF 100K 01 1/8W	D	7	EA	R2,4,21-23,28,35
	06	205	72-20035-010	5		RES MF 200K 01 1/8W	D	2	EA	R27,32
	06	206	72-22135-010	5		RES MF 221K 01 1/8W	D	1	EA	R65
	05	207	72-27435-010	5		RES MF 274K 01 1/8W	D	1	EA	R25
	06	193	72-33225-010	5		RES MF 33.2K 01 1/8W	D	1	EA	R3
	05	190	72-66485-010			RES,MF,68.4,1,1/8W	D	2	EA	R42,52
	05	210	79-00127-010			VARISTOR-METAL OXIDE,56VDC		1	EA	V2
	05	220	79-00128-010			VARISTOR-300V AC RMS .34 DIA		1	EA	V1
	05	37	81-00009-022	F		CAP,MET POLY,.22UF,1,250V		3	EA	C4,21,23
	05	40	81-00009-030			CAP,MET POLY,.05UF,1,250V		1	EA	C11
	07	25	82-00028-010			CAP,CER,.01UF,20,50V,.1SP		2	EA	C12,13
	06	30	82-00028-070			CAP,CER,.1UF,-20+80,50V,.1SP		5	EA	C1,5,10,16,19
	05	33	82-00028-080			CAP,CER,.22UF,20,50V,.1SP		1	EA	C22
	06	20	82-04734-220			CAP,CER,.047UF,10,100V,.2SP		2	EA	C2,3
	05	17	82-05604-310			CAP,CER,560PF,10,250V,.25P,RA		4	EA	C25-28
	05	15	83-03916-510	1		CAP,MICA,390PF,1,500V		1	EA	C8
	07	50	87-01074-410			C-FXD TA 100UF 10 20V RADIAL		2	EA	C17,18
	06	45	87-04754-610	G		CAP,TAN,4.7UF,10,35V,RADIAL		1	EA	C6
	05	999	95-50700-580	B		SCHEM FRNT PNL (SD-C700-580)	D	1	EA	REF
	05	998	95-50700-580	B		PCB ASSY FRNT PNL (ED-C700-5	D	1	EA	REF

PSRV99-END OF J08

A	SEE TABLE REL PER ECO # 2560		
B	REVISED PER ECO # 2503		
C	REVISED PER ECO # 2916	27APR 69	L. H.



[1] FOR LIST OF MATERIALS SEE 8500-0700-09

NOTES: UNLESS OTHERWISE SPECIFIED

ITEM NO	QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION
			PARTS LIST	

		710
	NEXT ASSY	USED ON
QTY PER	APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. TOLERANCES ARE: FRACTIONS ± ; DECIMALS .XX ± .; .XXX ± ; ANGLES ± . MATERIAL [1] FINISH DO NOT SCALE DRAWING

	APPROVALS	DATE
CONTRACT NO		
DRAWN	Jay Hong	8-19-65
CHECKED		9-18-65
QA		
PROJECT ENG		9-18-65
ENG MANAGER		9-25-65

CXR Larkspur, 751 RAVENDALE DRIVE, MOUNTAIN VIEW, CALIFORNIA 94040

HOUSING ASSEMBLY 710

SIZE	FSCM NO	DWG NO	REV
D1		ED-0700-09	C
SCALE NONE	STOCK AS 8500	SHEET 1 OF 1	

8 7 6 5 4 3 2 1

PRINTED 01-Apr-88 02:56 PM * * * C X R TELCOM CORP * * * EML VERSION 18-Nov-83 PAGE 1

EFFECTIVITY DATE: ALL S I N G L E L E V E L B I L L S O F M A T E R I A L

PARENT PART: 8500-0700-09 HOUSING ASSY-710 UM: EA PROD CODE: 7F ECN: ~~2380~~ 2918 ASSEMBLY QTY: 1
ERC: ~~B~~ C SRCE CODE: A TYPE: 1 ABC: B PLAN CODE: P DATE: ~~05-Mar-86~~ 18-MAR-88

ITEM NO	COMPONENT PART NUMBER	E R	DESCRIPTION REMARKS	PR CD	COMM CODE	S C	T Y	S P	A B	P L	UM	EXTENDED QTY PER	START DATE	S/N	CLOSE DATE	S/N	OPR SEQ	LT OFF	STORES ACCOUNT
005	1400-0101-01	+	FASTENER-DRAW CATCH LATCH ONLY																
			MP1	5Y		P	1		B	P	EA	1	10-Sep-86				10	0	CTL
~~015~~	~~2500-0700-03~~		~~X3 BATTERY COVER-710~~																
			MP3	7F		P	1		A	P	EA	1	15-Jul-85				10	0	CTL
020	2500-0700-04	A	CONNECTOR STRAP-BATTERY 710																
			MP4	7F		P	1		C	P	EA	1	15-Jul-85				10	0	CTL
025	2501-0700-61	B	HOUSING-MODIFY (TOP LATCH)700 SER																
			MP2	7Y	2501	F	1		B	P	EA	1					10	0	CTL
~~042~~	~~2800-0632-36~~	~~+~~	~~SCREW-FH 82DEG PHIL CD 6-32 .375LG~~																
			MP8	7Y		X	1		C	P	EA	2	16-Aug-85				10	0	CTL
045	2800-1001-03	+	RIVET-100 DEG CTSK .125 DIA .438 LG																
			MP7	ZZ		X	1		C	P	EA	2	10-Sep-86				10	0	CTL
055	4000-0017-00	+	BATTERY-NICAD 1.2V 450MAH																
			BT1	7Y		P	1		A	P	EA	4	15-Jul-85				10	0	CTL
~~060~~	~~6010-0700-14~~	~~A~~	~~CABLE ASSY-BATTERY,710~~																
			CA1	7F		P	1		C	P	EA	1	15-Jul-85				10	0	CTL
990	ED-0700-09	C ~~B~~	PCB HOUSING ASSY -710																
			REF	ZZ		~~D~~	~~*~~		~~*~~	U	EA	~~0~~	15-Jul-85				10	0	CTL

NOTES:

REV A, ECO #2380, 09 JAN 86
REV B, ECO #2503, 10 SEP 86
REV C, ECO #2918, 18 MAR 88

Document Title: Product Manuals	Document Number: ESC-0521-92-01
Revision Number: A X B_ C_ D_ E_	Page: N/A
Prepared By: Rick Schultz	Approved By:
Issued By: Jim Steinau	Issue Date: 10/19/93

CHANGE NOTICE SUMMARY

Revision	Reason for Change	Date of Change
A	INITIAL RELEASE DON PERRITT STAFF ENGINEER	11/17/93

ACCOPRESS®

25970	YELLOW
25971	BLACK
25972	LIGHT BLUE
25973	DARK BLUE
25974	LIGHT GRAY
25975	LIGHT GREEN
25976	DARK GREEN
25977	TANGERINE
25978	RED
25979	EXECUTIVE RED

GENUINE PRESSBOARD

ACCO® ACCO INTERNATIONAL INC.
CHICAGO, ILLINOIS 60619

82360